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ORIGINAL ARTICLES

A PRELIMINARY STUDY OF THE EFFECT OF RICKETS ON THE JAWS*

BY HUGH K. HATFIELD, M.D., D.M.D., BOSTON, MASS.

IN presenting this report on "The Effect of Rickets on the Jaws" no attempt has been made to include an exhaustive bibliographic review of the subject, but simply to give *first* an outline of some of the characteristic features and deformities seen on other parts of the body, together with some recent observations and conclusions of men studying the roentgenologic evidences of the disease; *second* to recall to your mind some of the recorded observations and assertions made regarding its deforming action on the *jaws* and as an etiologic factor in malocclusion. *Third* to show models of the teeth and jaws of the group of rachitic children under observation.

Rickets was recognized and accurately described more than two hundred years ago, yet today its etiology is obscure and its relation to diet is not clear.

McCollum[1] says: "It is a disease of the first two years of life, and is especially prevalent in children in whose diet milk is replaced too largely by cereals and other vegetable foods not suited to the delicate digestive tract of the young child." The nutritional disturbances often leave the child delicate and emaciated and the muscles soft and flabby. One of the earliest diagnostic signs to appear is the "rosary," the row of nodules which form at the junction of the ribs with their cartilages, and, though not always seen, can usually be felt when present.

A common deformity is the flattening of the sides of the chest with a prominence of the sternum, "pigeon breast," so called. When these are sharply defined and the abdomen is distended, a marked depression appears called "Harrison's groove," running from one side to the other about the level of the diaphragm. The head appears sometimes larger than normal and the prominent frontal emi-

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nences when they develop give the head a characteristic square-shaped look and can be readily distinguished from a hydrocephalic head which is symmetrically rounded.

The deformities seen in the arms and legs are sometimes extreme. The same epiphyseal disturbance responsible for the "rosary," enlarges the ends of the bones in the ankles and wrists. The legs may show all degrees of bow-legs, or knock-knee, and are sometimes bent in other directions. The arms also may be twisted and bent. A general rounded curve involving the whole spine may develop, or there may be a general collapse of the column.

It can be readily seen from this description that the most important and characteristic changes show in the bones, which are generally softened throughout the body during certain stages of the disease. Probably owing to some chemical change, an imperfect deposit of lime takes place. The new bone formed as the child gets better seems harder than normal, the so-called eburnated bone. Although comparatively little is known of the pathology of the disease the roentgenologic investigations of the bone changes are very interesting especially in the matter of differential diagnosis.

Lovett's[2] contribution published in the *Journal of the American Medical Association,* December 11th, 1915, is highly instructive and appears to have been the first attempt to trace the stages of rickets through a definite roentgen sequence. His comparative study of 500 or 600 plates of rickets showed the disease to divide itself naturally into three stages. The knee joint offered the most favorable conditions for study but the same manifestations are found in the other joints of the body.

In the first, or acute stage, the joint appeared cloudy, the epiphysis casting little or no shadow and the diaphyseal ends frayed out instead of clear cut. A severer type showed a general bone atrophy in the diaphysis and pronounced periosteal thickening.

In the second stage the epiphyseal shadow becomes more marked, the end of the bone broadens out into a lip or ledge, especially on the side on which the strain is greatest. Cortical thickening on the concave side of the curbed or bowed shaft is in the nature of a compensatory change in the bone structure.

The third stage carries through the period of convalescence. Epiphyses are clearly outlined and ossified and there is increased density of the bone. The thickening of the periosteum in the earlier stages clears up and shows no tendency to bone formation.

This is about all the pathology known and has been largely obtained through this very practical means of study with the roentgen ray.

Bringing the subject now into our special field, one finds in the current literature and orthodontic textbooks the following conception of the disease:

Rickets, characterized by a faulty development of bone, is a very important etiologic factor and deforming agent in malocclusions. It delays the eruption of the deciduous teeth which are in turn lost early with resulting malocclusion in the second dentition. There is faulty development of the alveolar process and of the bones of the mandible and maxilla. The marginal ridges of process are thickened and rounded.

Incisors of the upper jaw usually small, soft and friable. Permanent teeth damaged before their appearance, showing erosions on body and cutting edge. The upper jaw narrowed or V-shaped in form. Palate high vaulted and teeth crowded. Lower jaw shortened or trapezoid in form. Upper alveolar processes have a tendency to turn out. Lower alveolar processes to turn in. Of these signs the narrow or V-shaped upper arch with high vaulted arch palate seems to take first place as a characteristic deformity of rickets.

By way of clearing the ground for further investigation of the subject and that no doubt might exist in my mind as to the presence of these malformations I examined a group of ricket cases and made models of the jaws of every child in the group.

Material for study is usually easily obtained when once the subject for investigation is selected and planned. It is to be always borne in mind, however, that etiologic problems are still so complicated that frequently a subject is chosen for investigation which embraces so large a field that interpretation of the findings is difficult and the meaning of the data obscure. For this reason special effort was made to confine this study to a group of children with a clear diagnosis of rickets and in whom the characteristic deformities of the disease had developed. This group was found in the Massachusetts Hospital School for Crippled Children.

In most of the cases, so far as the histories could be obtained, the first indications of the disease appeared during the first and second years, and as will be intimated in the description of the illustrations, the deformities resulting were of rather a severe nature and distributed pretty generally throughout the group.

No attempt was made to determine the amount of disturbance in the order and date of eruption of the teeth or premature loss of the deciduous teeth. It would hardly be safe to make a diagnosis of rickets on this feature alone without considering the wide range of physiologic variability and the hereditary and individual peculiarities of the child.

It would naturally depend upon the date of the origin of the disease, but where there seemed to have been a premature loss of the teeth, no special disturbance in the development of the jaws was noted.

Furthermore, a careful study of each case seems to show nothing in the nature of jaw formation which might be called characteristic of the disease, and instead of the narrow or V-shaped and high vaulted palate, the arch forms seemed well within the limits of the normal.

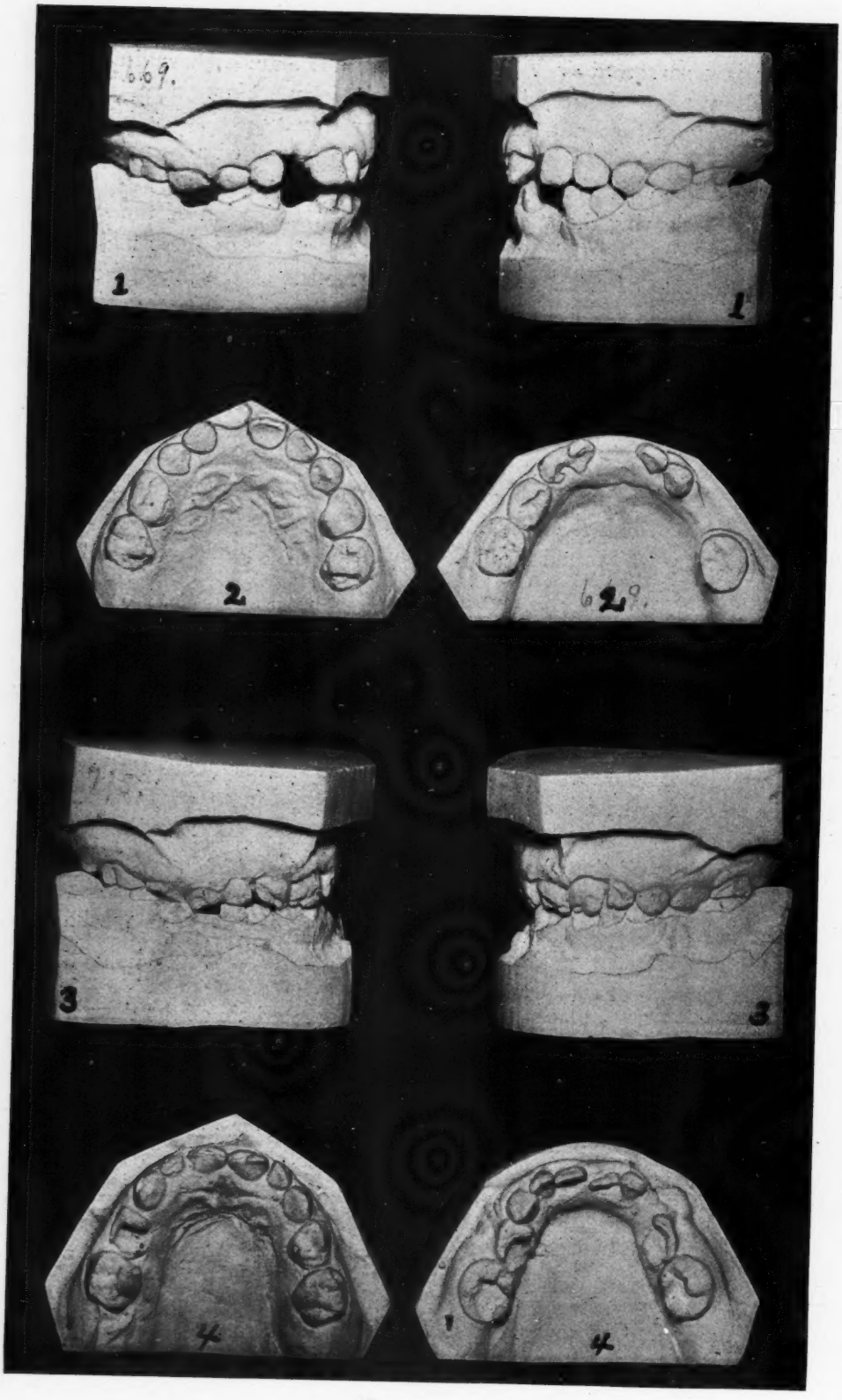
In the 150 children in the school, only 15 cases of rickets were found and I will suggest the severity of each case in the accompanying illustrations:

Figs. 1 and 2. Girl five years old, admitted in the hospital two years ago. Badly deformed arms and legs; knock-kneed, no marked deformity in the arch formation.

Figs. 3 and 4. Girl five and one-half years old—normal occlusion—well-formed arches.

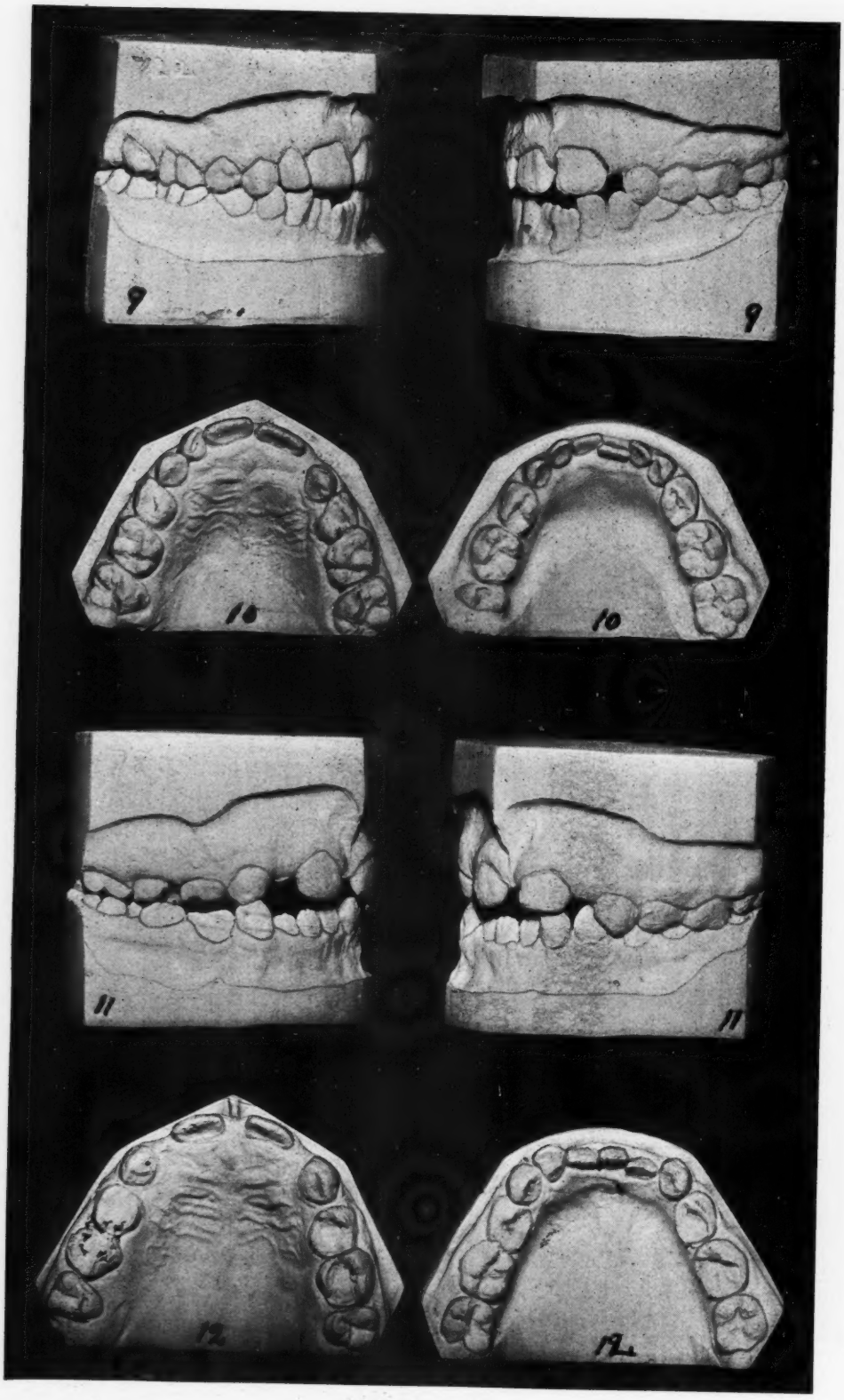
Figs. 5 and 6. Girl seven years old. Admitted in 1916. Rather severe case—flabby muscular condition. Could not walk when admitted.

Figs. 7 and 8. Girl seven years old. Admitted in 1916. Scoliosis—"rosary" and other signs.



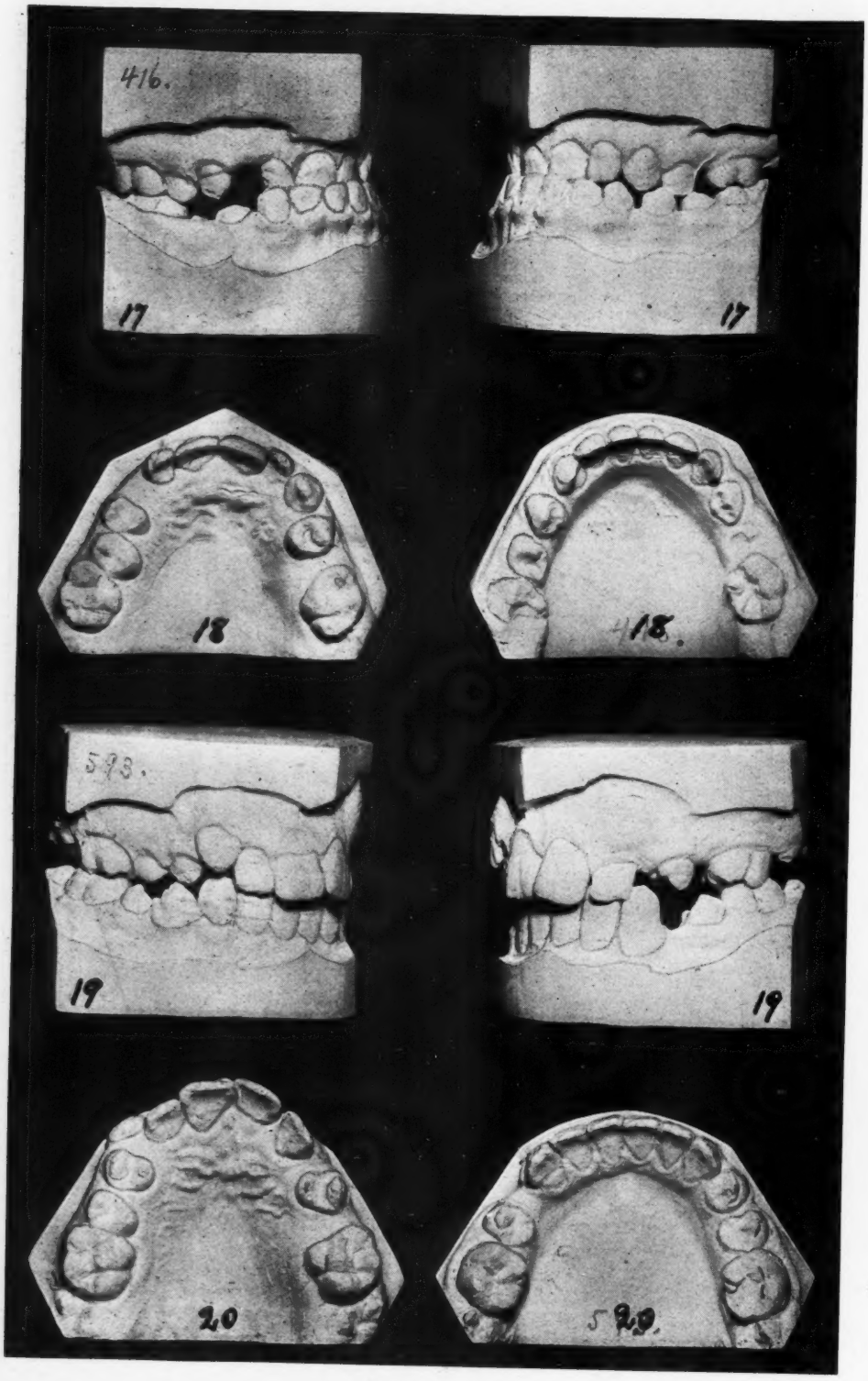
Figs. 1 to 4

Figs. 5 to 8

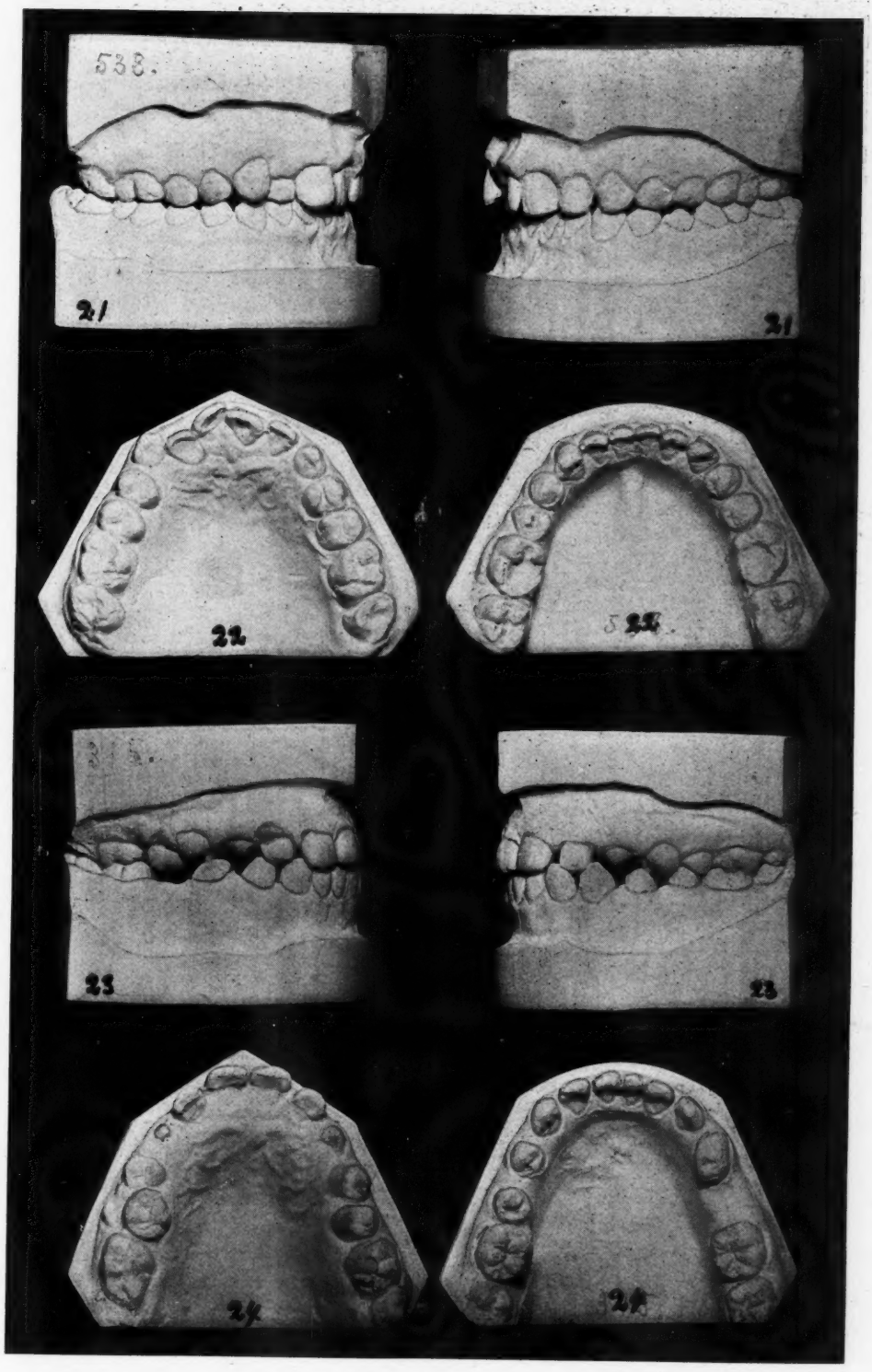


Figs. 9 to 12

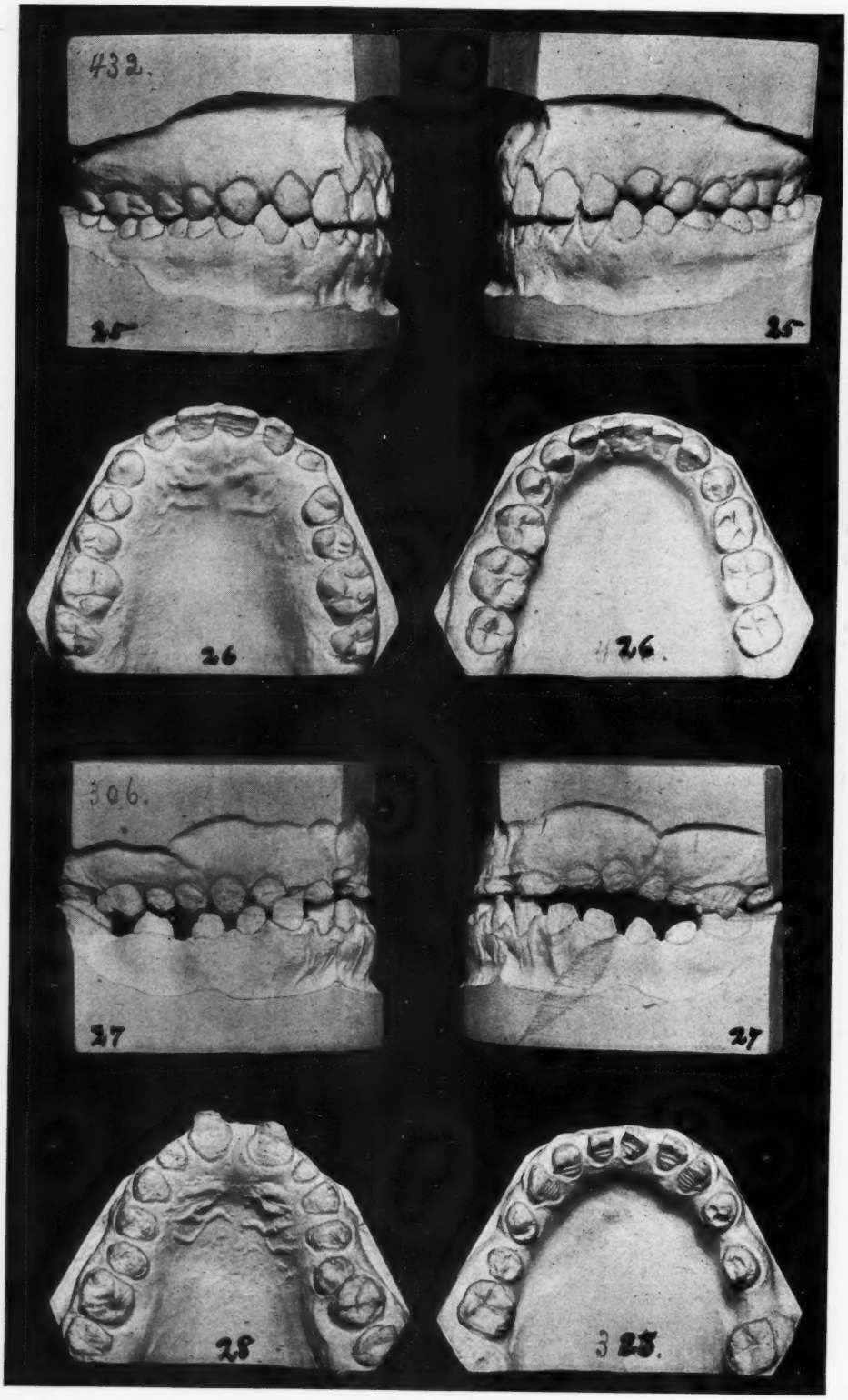
Figs. 13 to 16



Figs. 17 to 20



Figs. 21 to 24



Figs. 25 to 28

Figs. 9 and 10. Girl eight years old—very small—had difficulty in walking. Admitted in 1917—jaw development good.

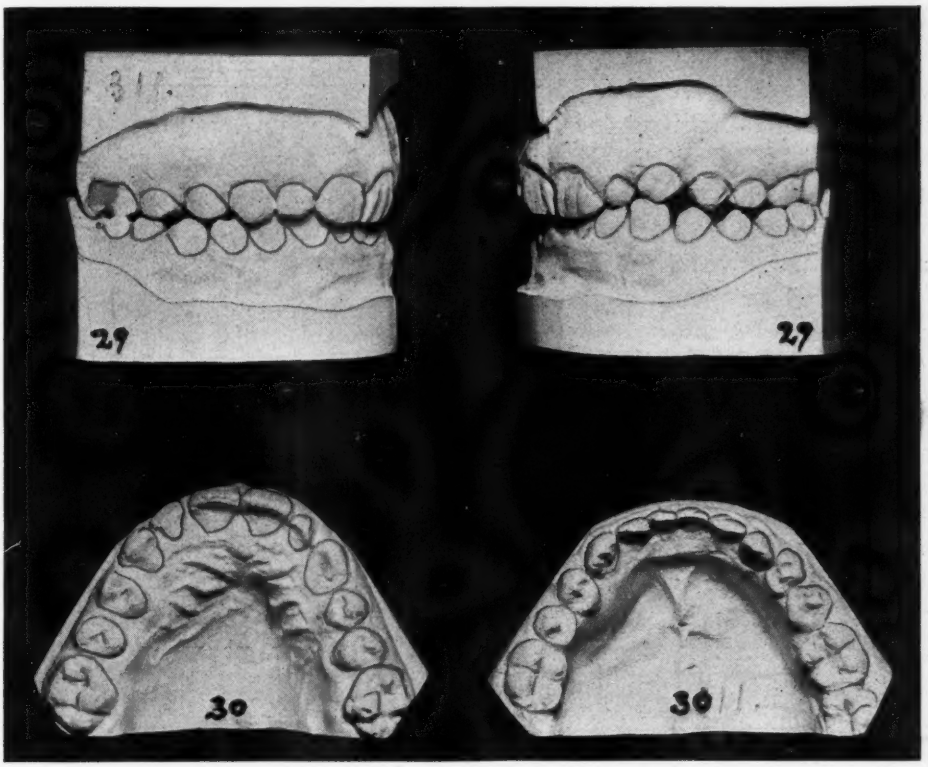
Figs. 11 and 12. Boy eight years old—arches well formed.

Figs. 13 and 14. Girl nine years old. Bad scoliosis—could not walk when admitted in 1913 and was in bed two years in the hospital.

Figs. 15 and 16. Boy ten years old, badly deformed back and legs. Teeth of first dentition mostly gone—no malocclusion resulting.

Figs. 17 and 18. Girl eleven years old. Admitted to hospital 1913. Upper incisors in lingual occlusion.

Figs. 19 and 20. Girl eleven years old. Admitted in 1916. Deformity of arms and legs, some crowding of the teeth and slight pitting of incisors.



Figs. 29 and 30.

Figs. 21 and 22. Boy twelve years old. Admitted in 1915. Nothing marked —slight irregularity of upper incisors.

Figs. 23 and 24. Girl twelve years old. Admitted in 1911. Very poorly nourished when admitted.

Figs. 25 and 26. Boy fourteen years old. Admitted in 1913. Bow-legs and other signs.

Figs. 27 and 28. Boy (colored) fifteen years old. Badly deformed back and bow-legs. The only case showing marked pitting; scarcely any enamel on any of the teeth.

Figs. 29 and 30. Girl fifteen years old, admitted in 1911. Case of bow-legs.

As no conclusions are to be drawn from the study of this one group of

rachitic children, a few speculative remarks may be permitted. The studies of the disease seem to show it to be essentially an epiphyseal disturbance of the bone, and an interesting question arises as to the existence or nonexistence of an epiphyseal cartilage in the mandibular joint.

Piersol[3] states (page 245): "The inferior maxilla has no epiphysis" and further says "as might therefore be expected, the ends of the bones at and near the articular surfaces are usually exempt from disease, in marked contrast to the long bones in which those regions especially suffer."

Alexander Low[4] (anatomy department University of Aberdeen) made a comprehensive study of practically complete series of many human embryos, and concluded that Meckel's cartilage does not enter into the formation of the lower jaw posterior to the incisor teeth, and that at a comparatively late stage in the development of the lower jaw (at the third month of fetal life) certain "accessory cartilaginous" nuclei appear in connection with the primary membrane bone. "There then is a well-defined, wedge-shaped condylar cartilage and a smaller coronoid cartilage. During the later fetal stage up to full term, the jaw rapidly becomes wholly converted into bone, all traces of the coronoid cartilage disappears, while remains of the condylar cartilage persists until birth. Further "accessory cartilages have no separate centers of ossification, but are replaced by undergoing regressive changes, being invaded by the surrounding membrane bone, destroyed by giant cells, and replaced by marrow tissue and trabeculæ of bone."

This would seem to have a direct bearing on the question of orthodontic treatment in cases of traumatic injury or ankylosis of the joint after operation. Length growth in some bones depends on the integrity of the epiphyseal cartilage plate; but if growth in the mandible is not of an epiphyseal character, the prognosis in these cases would naturally be more favorable.

Regarding the softening of the bones, this may be said to be a characteristic of the disease. The form which the bone takes on as a result of rickets is not typical of the disease, but rather that it expresses the mechanical forces acting upon it. For example: The rachitic child is with difficulty induced to walk or play, but prefers to sit with crossed legs on the floor. In this position the mechanical bending force may deform the bone. A bend in the wrist is sometimes seen in the child who has been led about by its nurse for some time. The weight of the feet and legs projected beyond the edge of a chair is thought to give an anterior bowing of the legs. The mandible is a plastic structure in health, and under the stress of mastication preserves its form; hence in the softening of the bone and with uniform muscular weakness, no change in the bone necessarily occurs. In assuming that the pull of the masseter, for instance, deforms the bone in rickets, you infer that it is the rigidity that resists the pull in health, which is contrary to the physiologic nature of bone. If the bone would be deformed as the result of the softening which is characteristic of rickets, then our conception of the normal formation of bone is at fault. We believe that the formation of bone expresses an equilibrium determined by function, that it is molded by the physical forces to which it is subjected, and the muscles acting upon it, and that to *change* the form of bone we must either apply artificial force or stimulus directly or indirectly through *changed* muscular action. We

have no evidence, so far as I know, that there exists any changed muscular action during mastication in a rachitic child during the acute stages when the bones may be softened. However, as the work on our etiologic problems in the different fields of investigation goes on, it becomes more and more evident that casual information and opinion must give way or be modified as more extensive qualitative analyses are made.

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PREVENTIVE ORTHODONTIA*

By Raymond J. Wenker, D.D.S., M.D., B.Sc., Milwaukee, Wis.

Professor of Orthodontia, Marquette University, Milwaukee, Wisconsin.

IN presenting this paper I wish to direct your attention to a large unorganized field of practice. Some phases of it have been practiced by the orthodontist for a great many years, while some he has overlooked or allowed to pass into the hands of the pediatrist, the eye, ear, nose and throat specialist, the general surgeon, the general dentist, etc.

DEFINITION

Preventive orthodontia comprises that field of practice which has for its object the foreseeing and inhibiting so far as practical, all etiologic factors of dento-facial malrelations.

Preventive measures, when compared with corrective measures under like conditions, are of a greater benefit to mankind. The prevention of an affection insures a greater physiologic result than it is possible to attain by corrective means. The most successful preventive measures prevent the establishment of pathologic processes, foreseeing and interdicting all handicaps to the normal physiologic growth.

Prevention in everyday practice is only occasionally so perfect as to anticipate and prevent all conditions, but more commonly it consists in recognizing and removing existing handicaps. The removal of these handicaps virtually amounts to making many minor corrections to prevent the later necessity of greater corrections. The necessity of these corrections should decrease as preventive treatment becomes more universally and effectively practiced.

The orthodontist has in a large measure neglected the most important part of preventive orthodontia, namely, the early stages of growth when most of the etiologic factors begin.

EDUCATIONAL PROPAGANDA

It is indeed difficult to decide how early this field of practice may begin. Perhaps a good point to begin with would be with the prospective mother in the form of an educational propaganda. I do not wish to discuss in detail what this propaganda should consist of, but in general, it should include a consideration of the physical, mental and moral requirements for the mother to acquire and maintain her health and the health of her child. Every mother should be informed how to live to bring a healthy child into the world. She should know that no greater honor and privilege can be bestowed on her than that of giving birth to a healthy child. And to this end she should be taught sane, hygienic, and rational methods of living that she may substitute them for her superstitions and fallacious ideas.

This phase of the subject overlaps that of the pediatrist's, but I can see no good reason why this propaganda should not be a combined movement including all parties interested and qualified to join in the undertaking.

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ETIOLOGIC FACTORS

One of the earliest active factors which influences growth is that of infection of the mother occurring prior to, or during pregnancy. The most important of these is probably that of syphilis.

SYPHILIS

If a fetus becomes infected with syphilis it may die and be aborted. If perchance the syphilitic mother should develop a degree of immunity against the Treponema pallidum the next pregnancy may result in the birth of a living child. Or, if by reason of antisyphilitic treatment of the mother the infection is reduced, the future pregnancies offer more encouragement. The recognition and treatment of this infection is indicated. The physician in charge will be the one called upon and whose duty it will be to diagnose and treat, not only the child, but the father and mother as well. The infection, however, may be so mild as to be overlooked.

Evidences of syphilis may frequently be recognized by the orthodontist in early childhood. The manifestations common in the newborn are coryza, mucous patches and skin eruptions. When these heal they leave scars, especially at the angles of the mouth and nose. Other manifestations later in life may be affected—sight, hearing, gummata in various parts of the mouth, Hutchinson's teeth, etc. Tardy eruption and extensive caries are also conspicuous in this affection.

CONGENITAL DEFECTS

Congenital defects, namely, harelip and cleft palate, are important affections interfering with normal jaw development and should receive early treatment. These children are frequently weak and delicate and require the care of the skilled oral surgeon. Treatment of these cases may be regarded as preventive measures in the field of orthodontia.

ACUTE INFECTIOUS DISEASES

The acute infectious diseases of childhood are important causative factors in the development of dento-facial malrelations. These affections are of interest to the orthodontist from the point of view that they cause, favor, or produce, hyperplasia of the lymphoid tissue of the nasopharynx and also cause a general perversion of metabolism and thus influence the growth of the child. Every general metabolic disturbance has a corresponding influence in jaw development, especially during the early stages of growth. The usual treatment is indicated in these affections.

GLANDS OF INTERNAL SECRETION

Federspiel has suggested that pituitary disturbances may have a bearing on jaw development to a greater extent than we have heretofore recognized.

There are two types of pituitary disturbances which may occur in childhood. The one is hyperpituitarism which produces excessive growth and the other is hypopituitarism which has the opposite effect resembling cretinism. In disturbances of the thyroid gland there is but one type which is of interest to the orthodontist and that is a hypothyroidism known as cretinism.

All bone dystrophies due to disturbances of the endocrine glands should receive organotherapy and other rational treatment according to indications.

NUTRITION

It has been evident for many years that the nutrition of the child in the first months of life is of great importance in relation to future growth. It appears that a given handicap to normal metabolism is more harmful in proportion as it occurs earlier in its life.

DIETARY CONSIDERATIONS

Dietary considerations are therefore the next in order, and although the physician in charge usually attends to this requirement, still the orthodontist should be familiar with this subject that he may intelligently discuss it with the parents or physician in its relation to jaw development.

Williams, an authority on obstetrics, has submitted evidence of the infrequency of normal nursing of infants. He makes the statement that less than 25 per cent of the mothers of New York State are able to nurse their children and that that number is decreasing. Hellman contends that arrested development of the jaws is more prevalent among artificially fed infants than among the breast fed. He has estimated that 81 per cent of arrested jaw development may be found in the artificial class. In the author's study of 643 children he has found 508 cases of maldevelopment of the jaws in the artificial class or a trifle over 79 per cent. That there is a large percentage of arrested development among this class is very evident to the observing orthodontist. This may be accounted for in the different proportion of the ingredients and digestible quality of cow's milk and other substitutes as compared with human milk.

Another interesting and valuable point in connection with artificial feeding is the greater susceptibility to infection among these children than those of the breast fed class. This may be accounted for in the prevalence of defective metabolism as well as the absence of the immunity imparted by human milk. The adenoid type is therefore more prevalent also in this class.

There are two preventive measures which suggest themselves to me which should be resorted to by the mother not able or apparently unable to nurse her children. The first choice is to encourage her organism to secrete milk by means of diet, exercise and massage, and the other is the old practice of employing a good wet nurse. Both of these methods have proved very successful.

If, however, artificial feeding must be resorted to, there are two important points to determine: first, the digestive capacity, and second, the caloric requirement of the infant. The former should not be overtaxed in the effort to bring the quality and quantity of the food up to the caloric requirement. To this end the entire dependence on any single or a combination of proprietary foods is contraindicated because of the large carbohydrate content and the deficiency of fat and protein which they usually contain.

RACHITIS

In my estimation, rachitis is one of the most important dietary disturbances in the entire list. I believe it is a much more active causative factor than it is generally conceded to be. Heretofore, we have only recognized it in its most pronounced form. As a matter of fact, there are a great variety of minor manifestations, and particularly that of arrested jaw development which have in a

large measure been overlooked. Lischer has called our attention to maldevelopment of the mandible resulting from rickets. Holt and Fischer have also mentioned it as a factor, but in a rather general way. In my studies and clinical observation it appears that in every case of rachitis with all of the gross classical symptoms there is usally a marked jaw deformity, equally as pronounced as the case illustrated by Lischer. There is also a large percentage of cases with minor general bone involvement which manifest comparatively mild forms of jaw deformities. Dewey has called our attention to the early shedding of deciduous teeth and tardy eruption of the permanent teeth in rachitic children. The absence of mechanical stimulus to the jaws supplied by erupted deciduous teeth from the shedding until the eruption of the permanent teeth must have a detrimental effect on their growth. Noyes has discussed this mechanical stimulus imparted to the growing jaws by the presence of the teeth. There is also manifested in rickets a tardy eruption of the deciduous teeth which frequently causes much difficulty, such as inflammation, pain and suppuration. The artificially fed class, however, does not supply all of the cases of rickets. Among the Italian and Ethiopian races a large number has been observed in the breast fed class by Hess. In his experiments with these cases, he has used cod liver oil with success as a corrective and preventive measure. For further information on this subject I would refer you to these authors.

Parents should be made to realize the full value of the services of the orthodontist from birth to early adult life to aid in the prevention of jaw deformities. His counsel in conjunction with the physician in charge should be of real value, provided, of course, that the orthodontist equips himself with the necessary knowledge to make his services valuable. He should be well informed on all questions pertaining to infant metabolism. He should be especially prepared to explain all phases of jaw development and tooth eruption and to take care of delayed and abnormal eruption. All dietary errors and pernicious habits should be detected early and steps taken for their correction. The child should be encouraged to use its teeth as soon as they erupt. To this end it should be encouraged to chew crusts of bread and other hard material, not for the food value, but for the exercise it may get in the effort. I believe strongly in the value of mouth gymnastics, beginning as early as possible and continuing during the entire growing period. Much credit is due to Rogers for his valuable discussion of muscular exercise in corrective orthodontia. It is likewise very valuable in preventive orthodontia. The stimulating influence to the circulation and digestion, and therefore, to normal metabolism imparted by this method, is very helpful. If, however, the supply of food material is deficient in quality, no amount of exercise will serve as a substitute for good food. Converting them into play has proved quite successful, especially in the hands of a clever mother. Another method is to reward the child for carrying out the exercises. As the child progresses in development it is, of course, understood that its teeth should receive regular prophylactic treatment. In fact, the entire mouth, as well as the nose and throat, should be kept in good health, during the growing period.

ADENOIDS AND TONSILS

A very important branch of preventive orthodontia, namely, the diagnosis and treatment of adenoids and troublesome tonsils has been largely neglected

by the orthodontist. If preventive measures are to be practiced in part, may I ask the question, why should not all preventive treatment be included? If the orthodontist is not prepared to do so, has he made ample preparation to practice his specialty? I contend that he should be prepared to practice all reasonable and legitimate phases of it.

Bogue, of New York, has called our attention to the frequency of arrested development of the jaws in early childhood. He maintains that the deciduous teeth should show a definite spacing between the ages of two and six. In other words, Nature should anticipate and get ready for the eruption and alignment of the larger set of teeth which she is growing in the deeper structures. This spacing should become manifest as early as two or three years of age by the expansive growth of the jaws larger than is necessary to accommodate the deciduous teeth. When it is most pronounced it may be observed in all parts of the arch. The widest spacing usually appears in the anterior part of the arch.

Fig 1.

Fig. 2.

Fig. 1.—R. M., age six, bottle-fed, adenoid and tonsil complication, lingual measurement of upper arch between the second deciduous molars is 24 mm. Permanent upper central incisors are erupted.

Fig. 2.—Same as Fig. 1, adenoids and tonsils removed.

In less marked cases it is evident between the anterior teeth only. Unfortunately, however, this spacing is absent or is evident only in slight degree in an extremely large percentage of the children of the present period. Bogue states that from 94 to 96 per cent of the children of the present period present evidences of arrested development of the jaws from two to six years of age. He has also called our attention to a normal minimum size of deciduous jaws. They should not measure less than twenty-eight millimeters in width between the lingual surfaces of the molars on one side to the same location across the arch. All jaws above this width manifest a definite spacing and all below show an absence of or deficient spacing. While we are disinclined to accept a definite measurement as indicative of the normal or abnormal, still a minimum measurement may serve the practical purpose of indicating, in the average case, the dividing line between the two classes.

The large percentage of arrested development of the deciduous jaws which Bogue has estimated, I presume, is calculated on this minimum basis. This percentage appears excessive, nevertheless, we are all agreed that there is a marked prevalence of arrested development in the present period.

Arrested development of the jaws is also to be observed in the adult. Abundant evidence of it is constantly before the mouth, nose and throat specialist. In an examination of the mouth, nose and throat of 2800 recruits for the United States Army, I have observed arrested development or deficient width of the jaws in fully 90 per cent. The cause of this condition was not ascertained but the great prevalence of it was carefully noted during this examination.

What relation there may be between the large percentage of bottle fed children, the large number of rachitic cases and the large percentage of arrested jaw development is impossible to correctly state. The 75 percentage of Williams, the 81 percentage of Hellman, the 78 and 90 percentage of the author, and the 94 percentage of Bogue are at least suggestive of a relationship.

These figures are, however, subject to modification by making a study of a still larger number of cases and by making due allowance for numerous other conditions. Racial, climatic, social and economic conditions have their influence and these have not received due consideration in a study sufficiently elaborate to make them final. We may, therefore, accept them as bearing only a tentative relationship.

TREATMENT

The treatment of these cases should consist of both preventive and corrective treatment. The question is: To what extent can these arrested and maldevelopments be prevented? It is probable that much can be done by an educational propaganda among mothers as previously mentioned. This propaganda should, in the course of years, effect a large reduction in the number of these deformities.

CORRECTIVE TREATMENT

As soon as this arrested development can be diagnosed, namely, between the ages of two and six, if the health and stamina of the child will permit, expansion of the jaws may be undertaken. Unfortunately, a very large percentage of these children are unmanageable, because of an unstable nervous system and harmful teaching. Much depends on the stamina of the child and still more upon the skill of the orthodontist. If, however, a given child can not be managed, the only alternative is to postpone the treatment.

METHOD

The question of method may be briefly considered at this point. The Richardson plate or some modification of it seems the most feasible. The modification which appears practical to me for this purpose is a removable basket, some type of lingual arch, or the new Jackson appliance secured by means of bands cemented to the teeth provided with lugs or tubes by means of which to automatically lock the appliance in place. This may be so made that the child can not remove it, but the operator can.

PREDETERMINATION OF PERMANENT ARCH

The next step is the predetermination of the permanent arch in order to serve as a guide in the expansion of the deciduous arch. This method, however, which I am about to describe, is not intended as a scientific correlation, but rather as a suggestion based on esthetic correlation. If expansion is under-

taken before the eruption of the permanent anterior teeth, x-rays of the upper central, lateral and cuspid on one side may be taken to determine their total width.

Using this measurement as the radius, draw a circle with a pair of calipers to represent the curvature of the upper permanent arch from the distal surface of one cuspid to the distal of the other. Then enlarge the x-ray of the labial aspect of the central crown, by photographic means until the labio-gingival curvature corresponds in size to the arc of the circle. This enlarged photograph of the central is then cut out on a line corresponding with the gingival curvature and proximal sides. Place this cut photograph over the circle and its proximal sides furnish a continuation of the arch from the distal surface of each cuspid, distally. This completed arch line will serve as an approximate guide for the size and shape of the future permanent arch of a given individual.

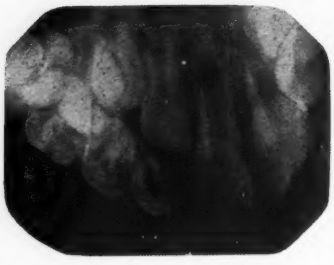

Fig. 3.

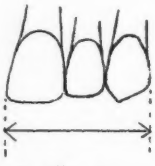

Fig. 4.

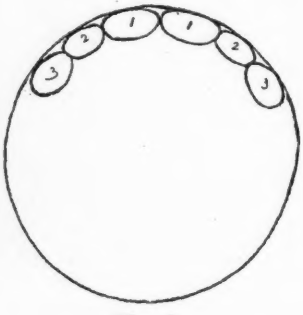

Fig. 5.

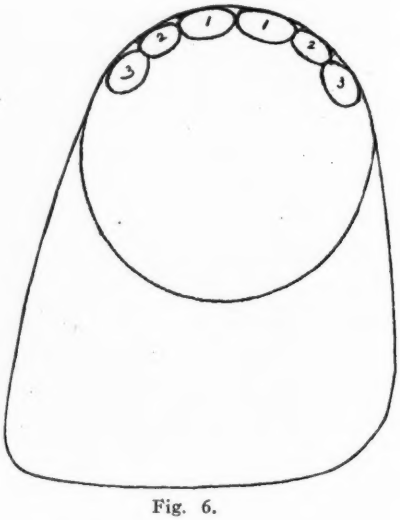

Fig. 6.

Fig. 3.—Radiogram taken to secure total width of central, lateral, and cuspid in the predetermination of the normal permanent arch.

Fig. 4.—Teeth aligned to obtain total width for radius of circle.

Fig. 5.—Circle whose radius is equal to the total width of the central, lateral, and cuspid, and the six anterior teeth of correct size sketched therein.

Fig. 6.—Labial outline of central enlarged to correspond at gingival end to circle in Fig. 5, and placed over the circle. Mesial and distal lines represent the approximal size and shape of normal arch in the bicuspid and molar region.

RETENTION

The length of time necessary to retain a deciduous arch after expanding will vary according to whether the patient is giving active cooperation in muscular exercises, according to age, the type of case and according to whether the arches have been overexpanded to allow for a certain amount of reaction of the tissues in contracting after removal of the appliance.

CONCLUSIONS

An educational propaganda on preventive orthodontia, including preventive pediatrics should be organized on a large scale and should be composed of interested and qualified members among the laity as well as the professions.

This organization should become a part of the general social service movement for better babies.

No field of educational activity can be of greater benefit to humanity than this.

A child with a defective initial growth is handicapped throughout life.

That the enormous prevalence of maldevelopment may be materially reduced there can be no question.

That this prevalence is largely due to artificial feeding appears evident.

The hazard to jaw development by artificial feeding is not generally recognized, neither by the laity nor the medical profession. Artificial feeding should be freely and persistently discouraged and the danger of it impressed on mothers.

The orthodontist should become a valuable consultant and coworker with the physician in pediatrics. This should begin with early infancy in preference to the custom of waiting until a deformity is recognized.

DISCUSSION ON THE PAPERS OF DRS. WENKER AND HATFIELD

Dr. M. N. Federspiel, Milwaukee, Wisconsin.—Dr. Wenker in his paper has covered the subject so completely that it is impossible to discuss it unless one disagrees with some of the views he has expressed.

With reference to the subject of diet, I will endeavor to point out to you what happens in animals when we have dietetic errors. In Wisconsin a farmer had some young pigs that were born without hair. This happened repeatedly, and he sustained quite a loss from a financial standpoint. He appealed to the Agricultural Department of the University of Wisconsin to find out the cause. They investigated it and tried to find the causative factor of why these young pigs were born without hair and were weaklings which died within a few days after birth. They added potassium iodide to the food at different periods while the sow was pregnant. A number of pigs were born that were perfectly healthy and lively and had plenty of hair.

The Department of Agriculture and Animal Industry of the University of Wisconsin undertook another investigation. They found that many of the calves of different farmers were born rickety, with large heads and had pot bellies and were not able to stand several hours after they were born. They found that the constant feeding of these cattle with roughage and wheat bran was the contributory cause as to why these young calves were born in that condition and were considered weaklings. By giving them a variety of foods and plenty of roughage they were able to produce calves that were perfectly healthy.

Now if this is true of young animal life, it can be proved as regards the human being.

It seems to me, we are living in an age in which we are not eating enough roughage; we are eating a lot of sloppy cereals and predigested foods and the offspring are either eliminated or get a rather poor start. So much for diet.

Speaking of syphilis, rickets and various other pathologic phenomena that enter into malformations of the jaw, does it not seem strange that some children of syphilitics have perfectly normal teeth, and yet they have the syphilitic manifestations in other parts of the body, which goes to prove that syphilis is not a respecter of any special organ. It may affect the kidneys; it may affect the brain or the eye; or it may affect the teeth. The child may have an iritis from a specific cause, although it may have a normal denture.

Dr. Hatfield showed us the slide of a patient who had been five years in the hospital suffering from rickets. I would call the mouth fairly normal in that case.

HISTORY OF ORTHODONTIA

(Continued from page 247, Vol. V)

By Bernhard Wolf Weinberger, D.D.S., New York City

W. STORER HOW describes in the *Dental Cosmos*, 1887, page 479, his *Appliances for Regulating Teeth:*

"The fundamental feature of the principal contrivance is a piece of thin platinum wire .030 in diameter, an inch and a half long, and threaded to the distance of four-tenths (.4) of an inch from each end. This is bent in the form of a double curved bow, Fig. 1, the arms of which are separated to the width of an average sized molar at its neck. A gold coupling plate, Fig. 2, is so constructed that the bow-ends will pass through it and receive the nuts. All these parts are shown assembled in Fig. 3 to constitute a molar yoke. A shorter piece of wire is also bent to form a bicuspid bow, and a suitable coupling-plate, is in like manner associated with this bow to form a bicuspid yoke, which is furthermore capable of adjustment on any of the oral teeth. The molar yoke is shown in position on an inferior left first molar, Fig. 4, and this result is easily accomplished by first pushing the threaded ends of the molar bow from the lingual side close to the gum between the molars, and between the molar and bicuspid, until the bow-ends project considerably from the buccal side of the molar. The

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

coupling plate is then put over the bow-ends and the nuts turned on by means of the lever nut wrench, in the hollow end of which a nut is first put and held by friction while being carried to and started on one of the bow-ends. In some positions it may be necessary to place the nut in the wrench-end of the lever in order to start the nut on the bow. The manner of attaching the bicuspid yoke is in all respects similar to that of the molar yoke, and, by means of the clips observable on the coupling plates, a limit is set to the tendency of the plates under the clamping action of the nuts to impinge upon the gingival margins. These clips are easily bent with pliers to adjust the limit on varying lengths of teeth-crowns, so that in no instance need there be any encroachment of the wire upon the pericementum or the festoons of the gums, for, in the event of an unusually close approximation of the teeth, the wire may be made thinner with a file fine enough not to leave a rough bur on the cut-away threads of the opposite sides of the filed wire. In some instances it may be best to have the two sides incline towards each other, so that a cross section of the threaded portions of the wire would exhibit a rounded V-shape which, with the base of the V placed next the gum, would permit the passage of the wire without any interference with the gums. In fact, the chief excellence of this contrivance consists in the facility it

(Copyright 1919 by Bernhard Wolf Weinberger.)

affords for immediately and firmly fixing a yoke upon any tooth, of any shape, and in almost any position in the mouth. If the inner surface of a tooth at its cervix shall slope so that the bow will tend too strongly towards the gum, then a limiting clip of gold plate may be soldered to the wire. This piece will also serve for the attachment of a ligature for moving that tooth, or others. For such moving purposes, however, it is better to solder on the wire a button, on which the ligature may be tied, or over which a rubber band may be caught, or from which these may easily be detached without disturbance of the yoke. The yokes are preferably so formed that the ends of a regulating bow-spring—like that of Dr. Patrick—will slide within them, and be clamped therein by the action of the nuts, which at the same time draw the yokes on the teeth. Thus the bow-spring may be quickly inserted, adjusted, and fixed in any desired position. Fig. 5 shows one anchored to a molar and a bicuspid."

In the *Dental Cosmos,* 1891, pages 114 and 198, we find another article by *How* under *Teeth Regulating Appliances and Related Devices of Thirty Odd Years Ago.* How states:

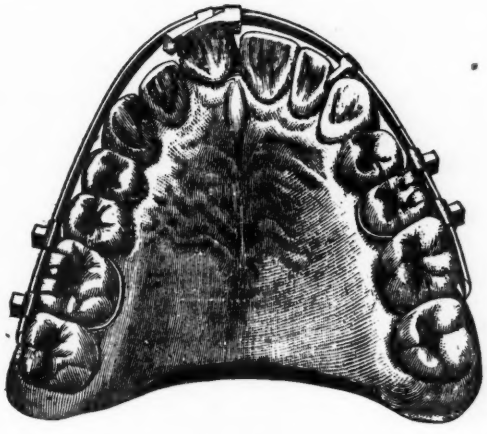

Fig. 5.

"Historically considered, many most useful contrivances will be found to have been reinvented from time to time until the successive periods have become so numerous that the names of the first originators are discovered only by painstaking research among remaining records, if, indeed, the earliest publication should no longer be accessible. A further element of uncertainty is the frequent obscurity and incompleteness of the descriptive terms in which the forms and arrangements of material structures were sought to be set forth; whereas an illustration, even if rudely drawn, would convey a clearer idea of the several parts of an operative device than many words, however skillfully chosen.

"Pictorial representation is now largely relied upon to impart correct notions of the character of constructions in every useful form, and this is particularly true of appliances for the correction of irregularities of the teeth. Some of these as shown in modern publications have features familiar to dentists of long experience, yet the mere recounting of such personal recollections might not be deemed conclusive to an ordinarily skeptical mind, and it was therefore with some degree of individual interest that in a recent rearward glance over the files of some dental journals there were discovered illustrations, some of which are

appended, printed from electrotypes taken from the original wood cuts without the slightest change or alteration in any of them."

After describing a great number of appliances by men well known to the profession How states (page 202):

"Many other well-known old devices described without illustration might with advantage to the profession be given pictorial embodiment as in the preceding new cuts, but these old cuts in their unquestionably clear anticipation of later devices relating to dental regulation, crown and bridgework, will certainly prove serviceable, and are respectfully submitted to whom it may concern.

"The devices which follow are some old and some new, but all embody the ancient principle of a spring-push or pull on the tooth or teeth to be moved. A simple form of finger-spring is made by first cutting a pattern from thin rolled block-tin and fitting it to a plaster cast of the teeth, although in some instances I have fitted it over the teeth in the mouth. From a piece of spring gold plate the regulator is then cut, closely following the pattern. In some instances it is desirable to get a close conforming fit by striking it on a metal die made from the cast. It is obvious from Fig. 6 that successive bendings of the spring finger will soon bring into line and place the errant cuspid, and as during and after the

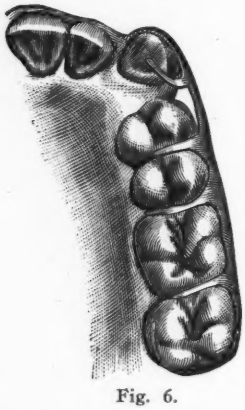

Fig. 6.

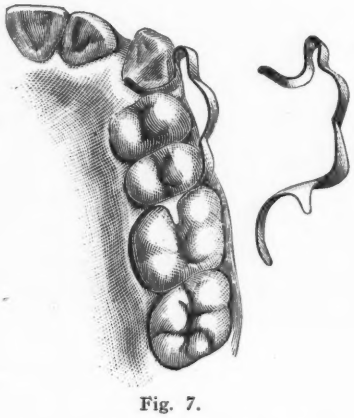

Fig. 7.

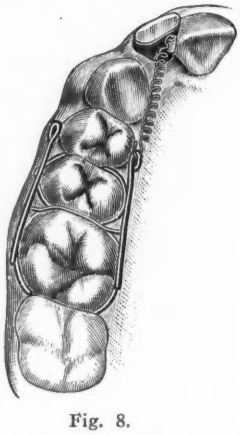

Fig. 8.

moving of the tooth regulator may be readily sprung off and on by the patient for cleansing purposes, it is also the fact that it serves as a retaining device which can be worn for any prescribed length of time.

"A forthpushing finger-spring of like character is illustrated by Fig. 7, both detached and in action after several days' use.

"A crib and collar with a pulling spiral spring is shown by Fig. 8.

"A spring-jack for push or pull action is readily made from suitable half-round wire, or by filing to half-round shape two pieces of pretty thick wire, as shown in Fig. 9. A spiral coil of fine spring-wire will then serve as a socket for the two half-round wires, and by simply touching the point of the soldering-iron to the ends of the spring they will be soldered to the thick wire, and the jack be ready for action. To increase the push power, it is only necessary to pull open the spring slightly. Attached to collars as shown in Fig. 9 (center) it will either push or pull as desired, adjustment of spring tension being easily effected by a touch of the soldering-iron; and as the springs are readily made, and kept at hand, a long or short spring can be quickly put in place. In Fig. 9 (bottom)

little sliding collars will enable adjustments of tension to be made while the fixture is in place. It will be observed by referring to Fig. 10 that when the two halves of the jack are inclosed within the spring, they are firmly prevented from rotation by the contact of their flattened sides, but they are free to slide forth and back as indicated by the arrows.

"In Fig. 10 the device is shown in action as a pushing-jack, and the peculiar adaptation of the neck-wires for simple security of impingement without disturbance of the gum-margins is apparent. For greater security ligatures are, of course, applicable, and can be added without difficulty.

"These spring-jacks can be made very small and short, and are therefore readily adaptable to clasps, and cribs, and plates of every kind; they can even be curved so as to act upon an arc of a circle."

A. E. Matteson in an article in the *Dental Cosmos,* 1888, page 68 entitled *A Regulating Device* introduced his method of compound coil and lever spring as follows:

Fig. 9.

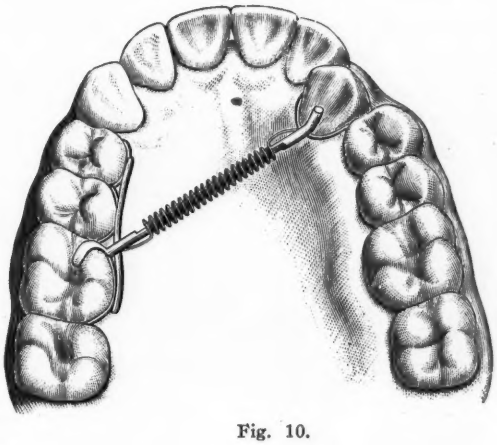

Fig. 10.

"In minor operations for the correction of dental irregularities, I have found very useful the compound coil and lever spring shown in Fig. 11. This is made of piano wire, No. 14 or 16, according to the degree of expansive power designed to be exerted by it. The diameters of the coils and the lengths of the levers are to be determined by the positions and relations of the teeth to be moved. So, too, the distance of the coils from each other will depend upon the circumstances of the case.

"Preferably the coils are to be made small and the levers short, in order that the device may lie close to the teeth upon which it is intended to act. A narrow ribbon is then made of gold or platina plate, as thin as No. 40, and of a length sufficient for its special purpose.

"In the case illustrated, the ribbon bends over the distal side of the central, passes behind the lateral, and comes out over the mesial side of the cuspid. The free ends of the spring levers are brought towards each other, and, by means of fine binding-wire or strong twine passing through their loops, are held against the expanding strain of the compressed coils (see Fig. 12). The bound spring is then to be laid over the ribbon ends as they rest on the central and cuspid, and the ribbon marked where the ends of the spring touch it. The ribbon is removed

and punched with a plate punch at the marked points, and also at other points near these and towards the middle of the ribbon, to provide for the taking up of the ribbon as its ends become separated by the distending action of the spring during the progress of the operation. The ribbon is again put in place on the teeth; the lever ends inserted in the punched holes, and the twine cut or the binding wire untwisted to bring the spring into operation."

In the *Dental Review,* 1892, page 563, *Matteson* explains his other method of treating irregularities:

"The appliance used is simple as you will see, and rather after that of Dr. Angle's system. After using and turning the screw, the teeth were brought forward, they had been worn so short it was necessary to elongate them. All that I did was to use the same appliance by bending the wire toward the cutting edge, the spring of it drew the teeth down.

"The first right molar and the first right bicuspid were banded. On the lingual side of the bicuspid was soldered a short tube. One end of screw-cut German silver (No. 20 gauge) was soldered to the band on the molar—the other end passing through the tube on the bicuspid band. (Fig. 13.)

Fig. 11.

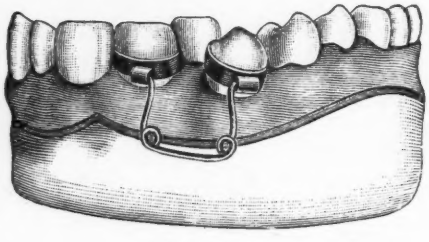

Fig. 12.

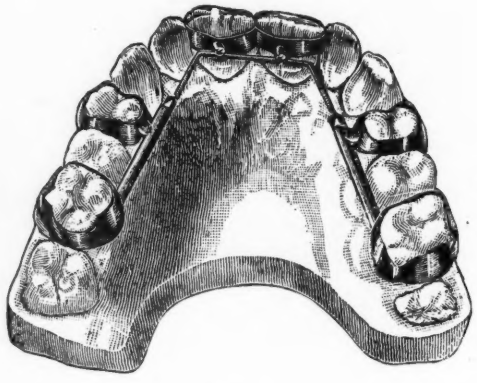

Fig. 13.

"On this wire screw between the bands, was placed first a nut then a T-tube, and in front of the T-tube and on the band of bicuspid another nut.

"The left central was banded with 'gold platina' plate with a lug on the lingual surface.

"The left second bicuspid was banded and a short tube on the buccal, and a long T-tube on the lingual surfaces, was soldered transversely.

"Schomacher gold-plated piano wire (No. 16 gauge) was formed, the ends passing into the openings of the T-tubes and in contact with the central incisor above the lugs.

"This piano wire was supplemented with another (No. 14) and united by winding with fine wire and soft solder. The free end of this wire (No. 14) forced out the lateral.

"The second bicuspid was rotated by changing the angle of the piano wire where it entered the tube of the left bicuspid.

"By turning the nut which is back of the loose T-tube forward the pressure was brought against the central and lateral. This also permitted the adjustment

of the expansion of the arch either in the region of the molar or bicuspid. The nut in front of the screw was used to draw the first bicuspid back.

"The tube on the buccal surface of the left bicuspid band was to lock, when in position with a pin.

"The long tube on the inside of this band was to support it with the contingency of cutting a thread on this end of the piano wire, and with a nut, form a jackscrew to assist in forcing the incisors, although the necessity for this did not arise. This piano wire which I have mentioned is superior to any which I have used. It might be improved by a heavier plating. It can be obtained larger than I have mentioned but I have found No. 16 sufficient to expand the arch of any case so far since commencing its use.

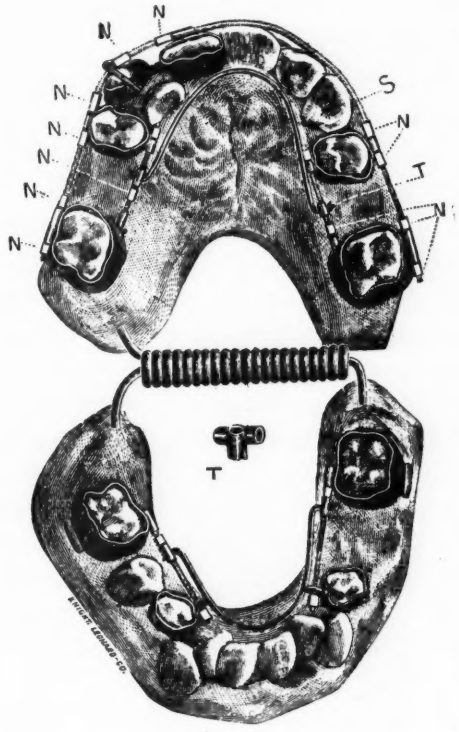

Fig. 14.

"In regard to making these nuts for irregularity cases, having found that cutting them out of solid nickel and German silver plate, to be drilled, tapped and squared, a very tedious process, I have simplified the method greatly by first drawing tubes of platinized silver (one part platinum and two parts silver), soldering the joint with 20 carat gold, then drawing through a 'square hole' draw plate, inserting piano wire in the tube, thus making a square tube with a round hole, then sawing off enough for a nut."

In discussing Dr. Jackson's paper before the World's Columbian Dental Congress, Matteson exhibited the appliance shown in Fig. 14, for expanding the dental arch:

"Fixed bands are constructed with such attachments as are required to carry the case forward to completion. On the upper model are the bands (cemented on the teeth), with tubes on the buccal and lingual surfaces. Around the labial

surface of the teeth extends a threaded gold wire (*S*) No. 22 B and S gauge, passing through and carrying nuts (*N*) in front and back of the tubes.

"The tubes on the lingual surface of the molars are tapped and receive a screw-cut rod which extends through the bicuspid tubes, with nuts (*N*) in front. On those bars are slipped T-tubes (*T*), and between each and the molar is a nut.

"The piano-wire spring is formed so as not to interfere with the occlusion and the comfort of the patient, and the ends bent at right angles, and passing into the cross tubes of the T. The nuts back of the T-tubes permit the adjustment of the action of the spring, either to the front or rear just where the force is required, and also may act as a jack-screw forcing out the inlocked lateral.

"On the end of the cross tube of the T-tube there is cut a slot or recess to receive the piano wire and lock it in position."

Dental Review, 1895, page 829. *Treatment of Irregularities of the Teeth with Cases.*

"The successful correction of this case was comparatively simple. The appliances were constructed of German silver as follows:

"Bands in the form of a figure eight were fitted to the first permanent and second deciduous molar on each side. To these bands on the buccal surface, and on the same horizontal plane, tubes were soldered. The lateral was banded, and on the lingual surface was soldered an open (wire) ring. Bands were fitted to the central incisors, embracing them as near the incisive edge; on the labial surface of each band was soldered a triangular shaped strip of plate $\frac{1}{10}$ of an inch across at its base, and the other two sides $\frac{5}{16}$ of an inch in length. To prevent the solder from flowing the whole width of the band a scale of mica was inserted. The points of these strips extended a trifle beyond the gingival margin. The mesial edges were placed parallel, for reasons to be explained later. A hard drawn wire (No. 20) was formed so as to extend around the labial surface of the teeth but not in contact with any but the central incisors at the gingival margins, the ends passing freely into the tubes on each side. The ends of this wire were threaded and nuts prepared for them.

"The place on the wire where the distal edges of the strips crossed it was marked, the wire removed and rings of smaller wire slipped to the marks and soft soldered without heating enough to draw the temper. After electro gilding, the bands were cemented to the teeth and allowed twenty-four hours to harden. The wire was inserted into the tubes and brought to place. A rubber ligature was looped over the wire, around and into the open ring back of the lateral.

"With pliers—one lip resting on the bases of the triangular strips and the other on their opposite points—the strips were curled over the wire. This was repeated two or three times a week, or as often as the soreness subsided.

"This shortening of the strips around the wire, which acted as a spring, forced the teeth into their sockets; while the wedge formed by the incline of the distal edges of the strips against the rings on the wire brought the mesial surfaces of the centrals together.

"After the incising edges of the teeth had been brought to their proper

alignment, the nuts were moved forward on the ends of the wire until the centrals were forced back into occlusion with the lower teeth.

"The same principle may be used to advantage in cases of retarded eruption not determined until later in life, by reversing the position of the triangular strip on the band against the wire, producing reverse action; or it may be used conjointly when one tooth requires subtruding and the other extruding, in which case reciprocating force is made available."

Other appliances as devised by Matteson are shown in Figs. 15 to 23.

S. J. Shaw, Cosmos, 1888, pages 211 and 215. Shaw's first description of *Regulating Studs* is as follows:

Fig. 15

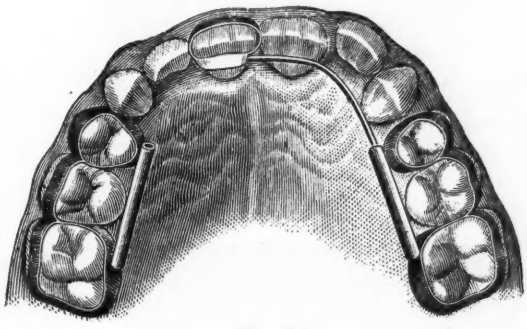

Fig. 17.

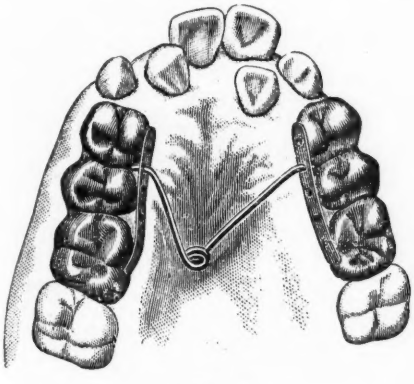

Fig. 16.

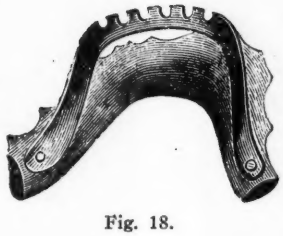

Fig. 18.

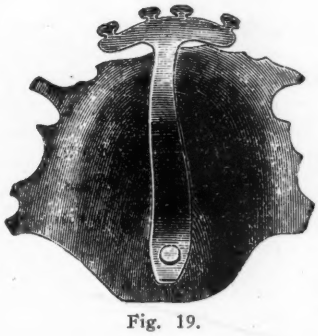

Fig. 19.

"Vulcanite and other fixtures for regulating teeth often require the attachment or insertion of studs or hooks, from which rubber rings may be stretched on to the teeth that are to be put into place. I have made such studs of celloid or hard rubber in form like that shown in Fig. 24, drilled and tapped through its center as shown in the section, Fig. 25. This stud I readily fix on the plate or bar by means of the screw, and a section through the stud, screw, and plate (see Fig. 26) makes evident the security of the attachment. In Fig. 27 is seen a plate in place, and a rubber ring stretched from the stud to the lateral, which is being pulled into position. The size of the stud-shank is such that the ligature will not be cut by the strain, and the stud-head is round and smooth, and overlaps the ligature, so that the tongue will neither be chafed nor interfered with to any appreciable degree during the progress of the regulating operation."

Under *Teeth Regulators,* page 215, *Shaw* then explains his method:

"For drawing outward an erratic incisor, a cross-bar, a screw with nut, and a loop or band form an effective combination. In application, however, the bar is apt to turn from the horizontal line, and to prevent this I solder to a face-

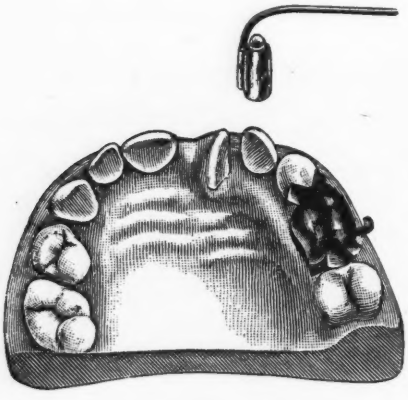

Fig. 20.

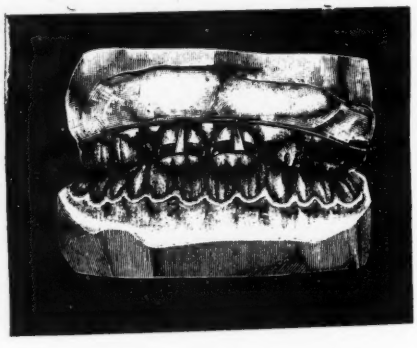

Fig. 22.

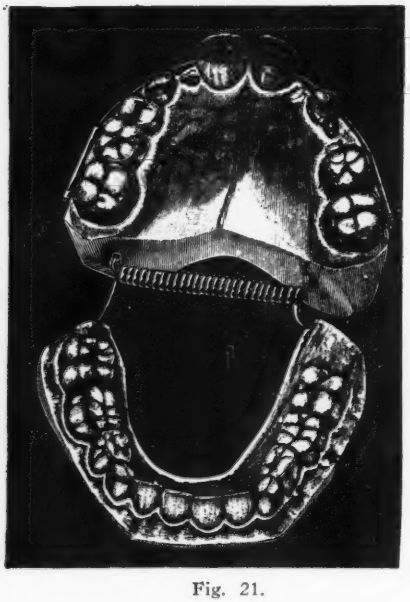

Fig. 21.

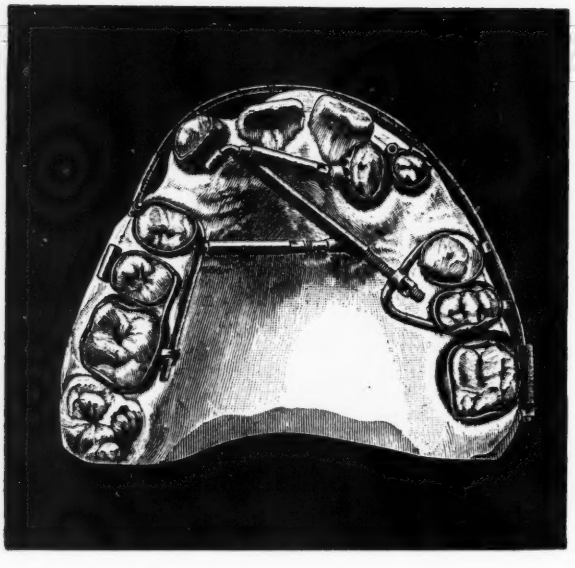

Fig. 23.

Fig. 24.

Fig. 25.

Fig. 26.

plate the screw and a parallel guide-pin (see Fig. 28), which with the screw passes through the bar and keeps it at right angles to the face-plate. This plate I attach to the tooth with waxed floss silk, and the fixture is thus made to serve for every such case that may be presented. For a retaining fixture, I simply solder a bar to a face-plate and tie it on with floss silk.

"The regulation of complicated cases I accomplish by a system of pivoted levers operated by jack-screws. In Fig. 29 it will be seen that the lower bicuspids must be moved outward before the cuspids can be brought in. For that purpose I made a vulcanite plate fitting over the bicuspids and molars. With a narrow,

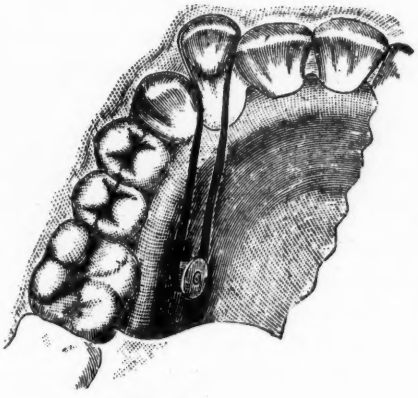

Fig. 27.

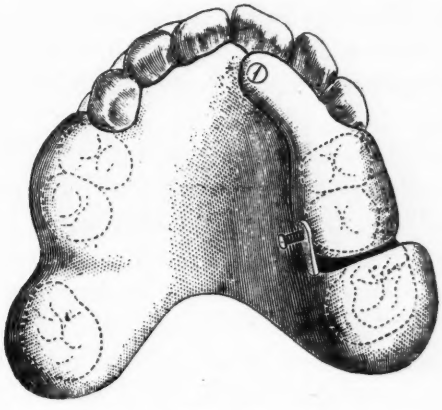

Fig. 30.

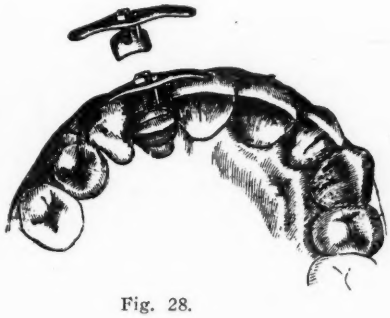

Fig. 28.

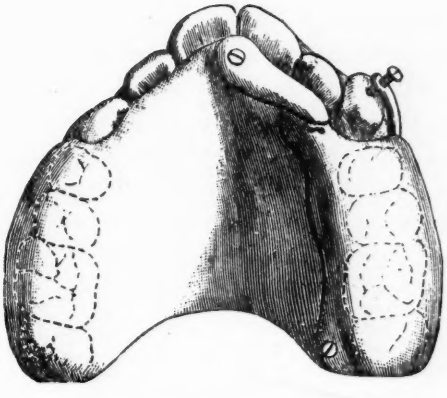

Fig. 31.

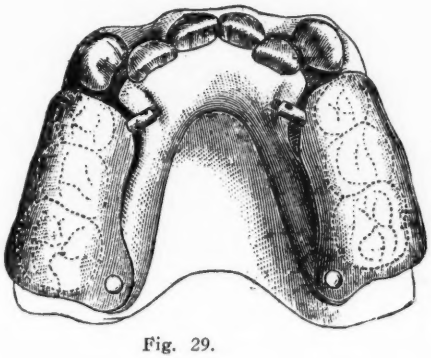

Fig. 29.

fine saw I cut sections from the plate of forms such as I could pivot at points behind the molars, and insert two jack-screws opposite the first bicuspids. The illustration shows the completed contrivance in position.

"In another instance, in which for improved occlusion it was desirable to push outward the left superior bicuspids, the pivot was placed opposite the cuspid, and a metal screw-arm built into the plate opposite the molar (Fig. 30). It is apparent that successive turnings of the screw would swing the lever outward and carry the bicuspids into place.

"Fig. 31 exhibits a case in which the superior left central incisor requires partial rotation, the lateral and both bicuspids an outward displacement, and the cuspid to be pushed inward. All these movements can be simultaneously effected by the compound pivoted levers and screw-arm shown. The illustration makes clear the details of the construction and operation of the device, which so directs and adjusts the mechanical powers brought into action that the turning of the screw against the neck of the cuspid will result in pushing it, and bringing the four other teeth into symmetrical alignment at one and the same time.

"It will be understood that in all the cases here illustrated casts showing the restoration of the teeth to their normal relations and positions have been at hand, but the cost of the cuts would be a great addition to the already expensive illustrations, and, therefore, as not really necessary to a complete comprehension of the operations, those casts have not been herein represented.

"I have other exemplifications of both the simple and compound lever appliances in models on casts of the cases in which they were employed, but the specimens given are deemed sufficient for the purpose of bringing the devices fairly before the profession."

(*To be continued*)

DEPARTMENT OF
ORAL SURGERY AND SURGICAL ORTHODONTIA

Under Editorial Supervision of

M. N. Federspiel, D.D.S., M.D., F.A.C.S., Milwaukee.—Vilray P. Blair, M.D., F.A.C.S., St. Louis, Mo.— Arthur E. Smith, M.D., D.D.S., Chicago.— William Carr, A.M., M.D., D.D.S., New York.—R. Boyd Bogle, M.D., D.D.S., Nashville. —Major Joseph D. Eby, D.D.S., Atlanta.—Thos. P. Hinman, D.D.S., Atlanta.

SOME PATHOLOGIC CONDITIONS OF THE MOUTH AND THEIR TREATMENT*

By Chalmers J. Lyons, D.D.Sc., Ann Arbor, Mich.

THE subject which your committee has asked me to talk on tonight is one of tremendous proportions. It is one that has been given too little attention in the past by the general practitioner. It is a lamentable fact that in the examination of the mouth, as made by the average dentists, the discovery of carious teeth is uppermost in the dentist's mind and his examination is completed when the tooth surfaces have been explored. The thought of making an examination of the mucous membrane, tongue, tonsils, pharynx, salivary glands, etc., is not usually considered. Blair, in his text book on *Surgery of the Mouth and Jaws,* says "until the much desired cancer specific is discovered, it is mainly to the educated dentist grounded in general oral pathology, who makes a complete survey of the whole mouth that the medical profession and the public must look to reduce the now increasing death rate from cancer of the mouth."

I wish then to call to your attention some of the pathologic conditions of the mouth and their treatment and to emphasize the great responsibility that the educated dentist must assume in his respective community.

Making a judicial dental diagnosis is not always a simple procedure and very often the skill and ingenuity of the operator is taxed to the utmost in working out the chain of evidence upon which he must base his decision.

A clear understanding by the dentist of the value of symptoms of disease he sees and of those described by the patient is of vital importance in making up this chain of evidence. One of the advantages of the dentist with long experience over the younger men is the ability of the older man to grasp the essential details of the condition at once. Much of this ability is gained by a gradual process through years of practice and observation.

It is true that in recent years the x-ray has aided us materially in our diag-

*Read before the Minneapolis District Dental Society, Minneapolis, Minn.

nostic work around the mouth, yet too many men in our profession are depending entirely upon the radiogram in making a diagnosis. While we concede that the radiogram is indispensable in dental practice today, yet it should form only one link in the whole chain of evidence in formulating the diagnosis.

The history of present and past illness, signs and symptoms are very important in determining the diagnosis. It has been the observation of the writer that the best diagnosticians in both medicine and dentistry today are those men who have been trained to objectively and subjectively differentiate the pathologic from the physiologic and use the x-ray only as a further means of arriving at a definite conclusion.

Do not misinterpret the meaning here. The use of the x-ray must not be depreciated. Yet the plea which is made is that we must not overlook the fact that the radiogram is not the picture of the pathology, but only a record of the shadow of the tissues and the extent of the pathologic involvement which appears upon the film will depend largely upon the angle from which the radiogram was taken. This, you will readily agree, is not sufficiently definite to wholly rely upon in forming a judicious and conservative diagnosis.

PAIN

One of the most perplexing problems that confronts the general practitioner is obscure pain localized in the jaws. These pains are frequently referred from some lesion distant from the point of manifestation. Many times healthy teeth are sacrificed in the endeavor to eliminate the possible source of so-called neuralgia, when the source of irritation is remote from the seat of pain, but misinterpreted by the patient. Goldschider has put forth a theory that in the Gasserian ganglion there are certain nerve cells performing a dual role. These cells have either split fibers or two separate nerve fibers, one running in one division of the fifth nerve and the other in one of the other divisions of the same nerve; thus pain may be manifested in the region of an upper cuspid or incisor tooth when the source of irritation is in a lower molar. A short time ago the writer had a case of pain in an upper cuspid tooth when the source of irritation was found to be in a para-tonsillar abscess, or on a branch of the lingual nerve and referred to the upper cuspid on a branch of the maxillary nerve. It is not at all an uncommon occurrence to find referred pain from impact or unerupted third molars. How frequently do we find headaches relieved after the removal of impacted teeth? The practical lesson to be derived from this is that the dentist should be on his guard against a number of sources of error in diagnosis of pain and that these cases demand of the dentist a most thorough knowledge of the anatomy of the field in which he labors. A slight derangement of nervous function may produce the most unexpected consequences in the most unexpected places.

With our present methods of nerve blocking, if the source of irritation is in either the second or third divisions of the fifth nerve, a definite diagnosis can usually be made by blocking off a section of each branch at a time and observing results.

In cases of severe tic douloureux, many times the teeth are sacrificed needlessly by the dentist in the endeavor to give the patient relief. This practice is so conspicuous that a very large majority of the patients that we see in the hos-

pitals of the University of Michigan who have suffered with tic for any length of time, have edentulous jaws. This is a practice that is not at all justifiable. Our knowledge of dental and oral pathology should be of such a high order that no tooth in the head should be sacrificed unless we are reasonably sure that the patient is going to be benefited.

Hutchinson—London Lancet 1918, says: "The extraction of teeth with a view of relieving or curing true epileptiform neuralgia or tic douloureux is a pernicious and useless practice." There exists no valid evidence to regard trigeminal neuralgia as a spreading neuritis of dental origin.

It is contended by many able-brained surgeons that the etiology of tic douloureux is of central origin and the elimination of the teeth would in no way be of any assistance in the relief to the patient.

Our experience in the past has been that alcoholic injections or even neurectomy for tic douloureux is of little more value than extraction of the teeth in offering permanent relief. It is the writer's opinion that operation on the ganglion itself, though attended with all of its dangerous sequela, is the only means of permanently relieving the patient.

Another type of referred pain in the inferior maxilla that is often perplexing to the general practitioner is that arising from an old syphilitic lesion. This is a referred pain from syphilis of the heart or aorta and is probably referred through the sympathetic system. It is not an uncommon condition and must be taken into consideration in running down these obscure pains. Such conditions improve under antisyphilitic treatment.

In my opinion, syphilis is a greater curse to mankind than tuberculosis. There is probably no other disease that is as insidious in its progress with as far reaching effects as this disease. At the present time our one bright hope in the control of this disease is in the army and in segregation of those afflicted. Syphilis is due to the infection with Spirocheta pallida and is only transmitted by contact. Consequently, it can only be controlled by segregation. A favorite site for the primary lesion or hard chancre is on the lip; it is also frequently found situated on the tonsils. The primary lesion is seldom found on the cheek or tongue.

In its incipient stage, it appears as a crack in the lip or an abrasion, surrounded by a thickening of the tissues, which is later destroyed by ulceration. This can be differentiated from certain forms of stomatitis in that the chancre is painless and usually causes enlargement of the lymph nodes.

Secondary syphilitic manifestations of the mouth are usually of an erythematous or ulcerative type, commonly seen on the oral pharynx as an inflammatory area, attended by little or no pain. The mucous patch may be observed on the edge and tip of the tongue, and on the dorsum of the tongue, uvula and fauces. These mucous patches frequently are found on the inner surface of the lips. They appear as large or small, either round or irregular plaques of a grayish white color covered by a sticky secretion.

These can be differentiated from the plaques of leucoplakia buccalis in that those from the latter can be traced as arising from a local irritation. Secondary manifestations of syphilis in the mouth may be differentiated from certain forms of stomatitis, Vincent's angina or other acute mouth lesions, in that the syphilitic lesions are not accompanied by much pain.

Tertiary syphilitic manifestations are frequently seen in the mouth as gummatous ulcers. These may be mistaken for carcinomata if on the cheek or tongue. On the tongue it will usually appear over the whole upper surface while carcinomata would be confined only on the edge and involve only one side of the tongue. Carcinoma of the mouth is frequently the site of an old syphilitic lesion. Jonathan Hutchins, Jr., informs us that in 30 per cent of patients suffering from epithelioma of the tongue, a history of former syphilis can be obtained; 20 per cent of epitheliomata of the tongue have their site on syphilitic inflammation.

Diagnosis of syphilis from mouth lesions is not at all a simple matter. The history of the patient is usually not reliable, for in the large majority of patients the knowledge of the presence of venereal disease is denied. The Wassermann test is the most reliable one at our disposal today. While all syphilitics will not give a positive reaction, yet it is very rare that a positive reaction can not be obtained in the presence of active syphilis.

What is the dentist's responsibility relative to the syphilis? When this disease is so prevalent as it is today, when its sequelæ are not so far reaching, when it is so easily transmitted to others, is it sufficient for us when examining mouths of patients to simply look for carious teeth? There can be but one answer to this question.

A few weeks ago a bright, fine looking Miss of 15 presented herself for mouth examination. When she opened her mouth, I was amazed to find that the whole palatal vault was missing, together with central, cuspid, bicuspid, and one molar tooth on each side. The condition was at once recognized as syphilis. In so healthy appearing an individual, the presence of congenital syphilis was dismissed. In obtaining the history, this syphilitic condition was found to have been induced by vaccination about four years previous. The only answer for the presence of this condition is that unclean instruments were used at the time of vaccination. This same unfortunate result might easily occur from unclean dental instruments after operating on a syphilitic. Today you say we all sterilize our instruments. Yes, but how about the hands? Do we use rubber gloves on these suspected cases and how about those cases we operate on that do not excite our slightest suspicion? Yet if a blood test were made, some of them would show a positive reaction.

The point I wish to leave with you is that more careful survey of the mouth should be made on every patient and if a suspected lesion is discovered, follow it up until it is identified. In the more suspicious cases, refuse to do anything until a Wassermann is made. It is now a matter of routine in many of the best hospitals of this country that a blood test is made of every patient that enters. It is only by the strictest vigilance on the part of all branches of medicine that this disease may not get beyond our control. Will dentistry do her part?

MALIGNANT DISEASES OF THE MOUTH

When we consider the invariable outcome of a malignant tumor of the mouth when not treated, with its attendant horrors to not only the victim, but also his family, when we consider the improbability of successfully treating these cases in the advanced stages, then we can clearly conceive the advantages and importance of making an early diagnosis.

The dentist usually sees these precancerous conditions long before the sur-

geon for the reason that the average patient does not present himself to the physician until physical discomfort compels him to seek aid. At this time the disease has progressed to such a stage that makes the condition inoperable or at least, the probability of successful treatment is greatly reduced.

The fact that the dentist has the opportunity to observe these mouth conditions in the early stages is the reason that Blair places the responsibility of early diagnosis upon our profession in his well delineated statement expressed in the beginning of this paper.

I believe it to be the moral duty of every dentist, not only to examine the teeth of his patients, but to make a thorough examination of the mouth, lips, tongue, pharynx and tonsils.

Any rough surfaces on the teeth which are producing a constant irritation should be removed. In cases of small chronic ulcers or sores in the mouth, a complete history of the case should be obtained. If the history should lead to the assumption of former syphilitic affections, then it should be looked upon with grave suspicion. One of these precancerous conditions with which the dentist will come in contact is leucoplakia. This is invariably caused by excessive use of tobacco. It is characterized by the formation of white patches on the mucous membrane of the tongue and may spread to the cheek. In the tobacco chewers an outline of the quid of tobacco in a white patch is sometimes observed on the buccal mucous membrane of the gums and cheek in the vestibule of the mouth. Leucoplakia is an idiopathic disease, insidious in its progress which begins with an opaque or white spot. The most common site is the dorsum of the tongue. These spots may ulcerate and coalesce into larger ones. In their incipiency these cause little or no inconvenience and if discovered at this stage usually the removal of the cause will eradicate the disease. As the growth progresses, they become painful and the tongue, lips or cheeks as the site may be, become indurated and slight hemorrhages may occur.

At this stage we invariably have carcinomatous degeneration.

The similarity between leucoplakia and secondary syphilis is often confusing. The syphilitic plaques usually appear on the border and back of the tongue and at the same time other patches may be observed on the gingiva, palate or tonsils. The syphilitic spots are soft while those of leucoplakia are hard.

In the diagnosis of precancerous conditions of the mouth, we must ever keep in mind that any constantly continued irritation may predispose to malignancy. We must ever keep in mind that there is no part of the body that is so subject to continual traumatism as are the mouth, lips and tongue. We must not forget the fact that a large number of patients seeking dental services past the age of 45 years, present mouths with teeth that are broken down with sharp edges or the surface abraded through the process of mastication, leaving knife edge surfaces that may abrade the soft tissues, giving rise to a chronic ulcer which may ultimately lead to malignant disease.

Many of these precancerous conditions can only be correctly diagnosed by microscopic examination. It is clearly the duty of the dentist when a lesion is present in the mouth that can not be diagnosed as ordinary dental disease, to direct the patient's attention to it and, if possible, have a microscopic examination made. In obtaining a section, always obtain normal as well as pathologic tissue in the section.

DENTIGEROUS CYSTS

This condition is frequently mistaken for a tumor or an alveolar abscess. It is frequently seen in mouths of men and women under thirty years. It usually takes the form of a cystic growth connected with teeth or tooth follicles when eruption is retarded. In the light of our present knowledge, the explanation for the formation of these cysts is largely theoretical. Thomes has given what seems to me the most plausible theory. He states that when the development of the enamel of the tooth is completed, its outer surface becomes perfectly detached from the investing soft tissue and a small quantity of transparent fluid not uncommonly collects in the interval so formed. This fluid ordinarily is discharged when the tooth is erupted but when from some cause the eruption is prevented, it increases in quantity and gradually distends the surrounding tissues causing a resorption and disintegration of the adjacent osseous structures. These cysts may go on developing until a large portion of the jaw is involved.

It may be differentiated from an osteoma, in that with the cysts, fluctuation and crepitation can usually be elicited. It may be differentiated from an alveolar abscess from the fact that the cyst is very slow in its formation and is not accompanied by pain. Sometimes a history of several months in its formation will be obtained.

The absence of any of the permanent teeth with the associated lesion suggests the possibility of a cyst.

An amber colored fluid may be aspirated from the cyst by means of the ordinary hypodermic syringe in completing the diagnosis.

The x-ray will show a definite cavity with a limiting membranous lining. The method of eradication consists of widely opening the cyst, removing the unerupted tooth or tooth follicles, entirely removing the cystic lining and treating the same as any other wound in the mouth of the same extent. It has been my experience that packing the cavity with iodoform gauze and irrigating with 5 per cent salt solution every 24 hours will yield good results.

The most serious sequela of a dentigerous cyst is the absorption of the bone against which the cyst exerts pressure. A large portion of the maxilla or mandible may be destroyed by pressure resorption resulting therefrom.

EPULIS, A FREQUENT MOUTH TUMOR—FOUND OFTEN IN THOSE WHO ARE CARELESS IN CLEANLINESS OF THE TEETH

Epulis occurs most frequently in childhood and young adults. In a series of 167 cases Scudder reports 49 of them were in men and 118 in women. Thus it would seem that women are more susceptible to these mouth tumors than men.

The irritation from a carious tooth may start an epulis, or a tooth root may serve as an irritation which will encourage their development.

Calcareous deposits on the teeth may also be looked upon as a possible etiologic factor. Bloodgood states that epulis stands between the really benign, slightly malignant, and the malignant connective tissue tumors.

There are two varieties of epulis. The fibrous epulis and the giant cell epulis, the giant cell epulis being the more common.

The fibrous epulis is ordinarily of small size projecting between two teeth

and spreading somewhat over the alveolar border. This type may become calcified extensively or in limited areas throughout its substance. The fibrous epulis is smooth and quite firm on the surface, not very vascular and does not bleed very easily while the giant cell epulis is soft and irregular, and contains many vessels and bleeds easily when disturbed.

This growth is slow at first, but becomes rapid as it progresses and many times will cause the teeth to spread apart with consequent loosening. As these tumors enlarge, they may remain attached to a small stalk. At first these tumors are benign, but later may lead to malignancy. The importance of early treatment of them can not be overestimated. They should be removed as soon as identified and subjected to a careful microscopic examination. The portion of the periosteum or alveolar process to which they are attached should also be removed. This may necessitate the removal of one or several teeth in order to remove the tumor in its entirety and unless it is completely eradicated, the effort to obtain a cure will be fruitless.

There is a greater tendency to do an insufficient amount of cutting than there is to perform an operation that is too radical. After the complete removal of the tumor and its source, the actual cautery should be used to sere over the wound.

Another very important and not infrequent pathologic condition of the mouth which is of vital interest to the dentist is Vincent's angina. The lesions are associated with a mixed invasion of fusiform bacilli and spirochetes vincenti. The fusiform bacillus was first described by Miller in 1883 who found that the infection occurred in clean as well as in unclean mouths.

During the decade following 1896 Vincent, a physician in Paris, wrote extensively on both the organism and the clinical findings. He gave the disease the name of Vincent's angina. It is defined as an infectious disease of the mucous membrane of the mouth, throat and bronchi. This disease or one simulating it, is prevalent among the armies of Europe, and is referred to as "trench mouth" or "trench gums." The disease probably has no connection with trench life except the conditions made possible by the collecting together of large numbers of young men. The one condition which favors the development of the disease is oral sepsis. Vincent's angina is a very infectious disease and when it makes its appearance in the army it soon becomes an epidemic. The disease is characterized by a deep tissue necrosis, covered by a whitish gray membrane. This membrane is easily removed and when rubbed off leaves a granular raw bleeding base. This leads to crater-like ulcers with irregular edges.

Barker and Miller, Jr. A. M. A. Sept., 1918, classify the symptoms as follows:

Objective signs:

1. Insignificant as a rule of constitutional disturbances. The patient is not very ill.
2. Absence of fever, the temperature rarely rising over from 100 to 101.
3. Heavy and offensive breath.
4. Enlargement of the cervical and submaxillary glands, as a rule, moderately. They are tender and never suppurate.
5. The lesion itself.
6. Swollen, spongy and bleeding gums suggestive of scurvy.

Subjective symptoms:

1. The patient complains of extremely bad taste in the mouth.
2. Tenderness of the gums, so that the use of a tooth brush is impossible and mastication is so painful as to preclude eating.
3. Pain in swallowing.
4. Looseness of the teeth, with salivation which is common, resembling mecurial ptyalism.
5. Anorexia, or loss of appetite.
6. Joints painful.
7. Lassitude—"lack of go."
8. The most serious constitutional symptom and one always present when the teeth and gums are effected, is severe depression.

The prognosis is usually favorable. Most cases run a benign course. If seen early the case can be controlled easily. Internal medication has little or no value.

The care of the mouth is the first essential step in prosecuting the treatment. A solution of one-half of one per cent potassium permanganate used as a mouth wash every three hours will yield good results. The application of 7 per cent tinct. iodine to the pockets around the teeth and touching the ulcers with silver nitrate (concentrated solution) is recommended.

Emrys-Roberts—*British Medical Journal,* 1917, recommends the following lotion. Hydrogen peroxide, 5 fluid ounces; wine of ipecac, 3 drams; glycerin 5 drams; and water sufficient to make 8 ounces.

Local applications of arsphenamine in concentrated solutions or dusted over the surfaces are regarded as one of the best therapeutic measures obtainable. The mouth and teeth should be made as clean as conditions will permit before resorting to local treatment.

DISEASE OF THE ANTRUM OF HIGHMORE

What is the dentist's responsibility relative to the treatment of these cases? I believe that greater good and more satisfactory results can be obtained by cooperation of the rhinologist and the dentist in these cases. It is a matter of making a correct diagnosis. When the disease is of purely dental origin, then the responsibility should fall upon the dentist to handle the case. If the accessory sinuses are the etiologic factors in producing the disturbance, then the responsibility must rest upon the rhinologist.

There are just three principles that we must keep in mind in the treatment of empyema of the antrum.

1. Remove the source of irritation.
2. Drainage must be established.
3. Ventilation must be maintained.

In other words, treat it as any other abscess in the body is treated with the addition of maintaining ventilation.

I wish again to emphasize the importance of making a correct diagnosis. This is more important than the character of the operation. It is not of so much importance as to whether drainage is established through the nasal or oral cavities as it is that the source of irritation be removed. Too often dentists open into the antrum in the attempt to effect a cure when the source of irrita-

tion is in the frontal or sphenoidal sinuses or ethmoidal cells. In these cases only two of the three principles are carried out, viz., drainage has been established and perhaps ventilation maintained, but the antrum still discharges because the source of the trouble is still present. It is such cases that have led to the criticism of the Caldwell-Luc operation, or opening the antrum through the canine fossa. A criticism that is frequently made is that the opening will not close. Of course it will not close if pus is continually discharging through it. If the source of irritation is removed, it has been my experience, and in this I am sustained by many others, that it is difficult to keep the antrum open long enough to treat it. This whole proposition can be reversed if the source of irritation is of dental origin, then opening through the nasal fossa will not avail a cure. It merely establishes a drainage. Hence again, the method of operating is of secondary importance.

In cases of empyema of the antrum, when the source of irritation is of dental origin, I prefer opening into the antrum through the canine fossa, making the opening large enough to explore the antrum with the forefinger, thus septi may be discovered and cut away if necessary. The antrum is then irrigated with a 5 per cent salt solution and packed with iodoform gauze for 24 hours. The gauze is then removed and not replaced, but a gutta percha button is fitted to the opening to keep out food debris, etc. The antrum is then irrigated every 24 hours for 3 or 4 days, then the irrigations are made less frequent. The gutta percha button is cut down each time of treatment until it is reduced to 5 mm. in diameter, when it is left out entirely and complete repair takes place.

We shall now consider briefly a phase of one of the most common pathologic conditions found in the mouth, viz., those morbid conditions involving the pericemental membrane. The writings on the subject of mouth infection have been voluminous during the past five years, and in this discussion we shall confine our thoughts to the eradication of those infections found at the ends of the roots of the teeth.

*Dental and medical science have made it clear that pathologic conditions of the pericemental membrane and diseased ends of the roots of the teeth are a contributing factor to, and frequently the primary cause of, general systematic disturbances. The physician and the laity are looking to the dentist to eradicate these conditions. This can be done in one of two ways:

1. Extraction of the tooth followed by currettage.
2. Surgical interference at the focus of infection, mechanically removing the morbid condition leaving the healthy tissues to go on functionating.

It is a well-known fact that with our present methods of root canal therapy few of these morbid conditions can be so corrected that we can conscientiously assume that the area is free from infection, and will remain so.

By what steps then are we to decide whether extraction of the tooth is indicated or whether the greatest service to the patient can be rendered by root resection? No hard and fast lines can be drawn as to just when root resection is indicated and when extraction of the tooth should be the operation of choice. Here again we come to the great question mentioned in the first part of this paper, viz., diagnosis. A correct diagnosis of each case is not a simple matter.

*Lyons—Indications and Contra-indications for Root Resection.

The first question to determine is: Are general conditions favorable to normal repair of bone? To determine the answer to this question, there are several vital factors that must be taken into consideration. First, the present state of health of the patient; second, the past illness, and the possible recuperative or reserve force of the patient. The lowering of the vitality through chronic alcoholism or such diseases as tuberculosis, syphilis and diabetes which lead to a state of constitutional dyscrasia will have a profound influence in preventing repair, and re-development of normal tissue.

Age is another factor which should be considered. In the aged, the process of repair is slow and the prognosis for bone regeneration is not so good as that in the young or in middle life. In the aged the operation of root resection is not undertaken without considerable hazard. The normal or abnormal circulation of the blood is still another factor that plays a very important role in making up a judicial diagnosis. It is an established surgical fact that without a certain definite blood supply to a part, repair of tissue will not take place. Notwithstanding the fact that the teeth and surrounding structures have a very rich blood supply, in certain types of individuals and under certain pathologic disturbances there is not sufficient blood supply to the apical area to insure repair of the parts after the operation of root resection.

The clever diagnostician will discover this condition before making his final decision as to the character of his operation.

THE X-RAY IN DETERMINING THE OPERATION INDICATED

The proper evaluation of x-ray findings is very important to correct diagnosis. If the case is of an alveolar abscess of long standing, or a case of imperfectly filled root canal with granuloma showing in the apical area where all of the evidence points to disease or death of the pericemental membrane in the apical areas, it is my opinion that surgical procedure rather than dental therapy is indicated.

The character of the surgical procedure may be root resection in favorable cases and extraction of the tooth in the unfavorable ones. Here again another question arises—what are the points of differentiation of the favorable and the unfavorable cases?

It is a lamentable fact that many men are resorting to root resection as a short cut method for curing an alveolar abscess over a beautiful crown or bridge attachment without first removing the same and sterilizing and filling the root canals. If the canals and dental tubules are not previously sterilized and the canals thoroughly filled, a re-infection will occur from the tubules exposed when the resection is made.

It is not permissible to leave a crown on an imperfect foundation because it is a masterpiece of art. If it is not worth while to remove it and sterilize the canal and tubuli, then it should be extracted.

Too often root resection is resorted to for the purpose of saving a nice piece of bridgework and the patient's health is jeopardized. We are not doing good surgery when, as a matter of routine, we do not insist that the canals be sterilized and filled just previous to the operation.

The question of sterilizing and completely filling canals in multi-rooted

teeth for the eradication of an infection, is a very doubtful procedure and in my opinion the patient's welfare will be better taken care of by extraction followed by currettage of the bone. In no cases should this operation be resorted to when the bone and pericemental membrane are diseased beyond the apical third of the root.

The technic for the operation of root resection will vary with the individual operator. Equally good results will be obtained by methods that are quite different. The greatest factor in the success of the operation is a correct diagnosis of the case. The welfare of the patient should be the first consideration; a hasty diagnosis will often lead to failure, and the patient will consequently have to suffer from the operator's misconception of conditions.

DEPARTMENT OF DENTAL AND ORAL RADIOGRAPHY

Under the Editorial Supervision of

JAMES DAVID MCCOY, D.D.S., Los Angeles—ROBERT H. IVY, M.D., D.D.S., Milwaukee

B. FRANK GRAY, D.D.S., San Francisco—C. O. SIMPSON, M.D., D.D.S., St. Louis.

It is the object of this department to publish each month original articles on dental and oral radiography. The editors earnestly request the cooperation of the profession and will gladly consider for publication papers on this subject of interest to the dental profession. Articles with illustrations especially solicited.

THE USES OF THE X-RAY IN MODERN DENTISTRY AND MEDICINE*

BY FRED W. ZIMMERMANN, D.D.S., YOUNGSTOWN, OHIO

THE x-ray, as most of us know, was discovered in the year 1895, by William Conrad Roentgen, and has also been known as the roentgen ray, being so named after the man who discovered it. It has only been within the last few years, however, that the dental profession was awakened to its almost unlimited use and wonderful diagnostic aid in the practice of dentistry.

The use of the x-ray in dentistry is not a fad, as some men are inclined to believe, but an absolute essential and necessity for correct diagnosis. In fact many of our best diagnosticians in both the profession of medicine and dentistry often demand a full mouth x-ray examination of patients presenting themselves for treatment.

The time has at last arrived, when we are able by the use of the x-ray to see the results of our work and efforts. By employing the radiogram, nearly all guesswork is eliminated, and we should, for that reason, be able to give the public greater and better service than ever before in the history of dentistry. There are some few instances, however, in which the x-ray may not be regarded as infallible evidence, but in the vast majority of cases the evidence which it produces is an absolute reflection of existing condition. Such conditions as periapical abscesses, cysts, necrosis, osteomyelitis, sequestra, lost roots, root canal work, broken broaches or instruments in root canals, perforations of roots, fragments of instruments lost in the surrounding tissues, pre-operative orthodontic treatment and check up and impacted and missing teeth are definitely located through the aid of the x-ray, when all other diagnostic means have failed.

*Read before the Alumni Society of the Dewey School of Orthodontia, St. Louis, Mo., March 6-8, 1919.

Also in pyorrhea cases, the dentist is enabled to determine which teeth can be treated and retained, and which are to be extracted.

One of the most interesting subjects in the whole field of radiography is that concerning the use of the x-ray in dental and medical practice. The dental radiogram offers practically the only certain means of detecting and locating focal infections with pathologic conditions of the teeth, jaws and surrounding tissues of the oral cavity, which are established as etiologic factors of constitutional conditions or secondary lesions localized almost in any part of the body. Such secondary effects or lesions may include all manner and forms of symptoms such as pains in the head or neck, neuritis, arthritis, appendicitis, gastrointestinal disturbances, endocarditis, rheumatism, inflammatory lesions of the eye, abnormal mental condition, including melancholia, irritability, insomnia, neurasthenia and temporary insanity. Should any one or more of these conditions be present, a complete x-ray examination should be made of all the teeth and roots before the dental operations are carried on.

One can see by the number of different diseases just mentioned that almost every branch of medicine and surgery is affected, and hence the men specializing along these lines must or should all be interested in dental radiography. For this reason the need of absolute cooperation among all the specialists of medicine and surgery can not be overestimated.

It is a known fact that many of the dental conditions that cause the more serious secondary disturbances, do not always make known their presence by the symptoms of pain. In the majority of cases, if they did, the patient would immediately seek the dentist and treatment would be instituted before other harm resulted. Any number of these painless dental lesions are found, not by the dentist, but by the specialist during the course of routine radiographic examinations, which were made upon advice after the patient had appealed to him for relief from the secondary lesions.

It is usually a daily occurrence to have patients presenting themselves to the physician, internist, neurologist, orthopedist or other specialists for relief, because of symptoms arising from secondary lesions, and in case after case, these secondary lesions by the aid of the x-ray can be traced back to dental conditions. So it behooves us to see that infection is removed, whether due to unfilled roots, abscessed teeth, pyorrhea or what not.

In cases presenting themselves for radiograms, it is imperative that the very best radiograms are taken, and if any area is at all doubtful, other radiograms should be made at different angles. It is often very surprising how differently a condition will appear when taken from several different angles, and oftentimes a tooth at one angle appears to be perfectly healthy, but taken at different angles will often show up a large area of infection.

The x-ray picture, as we all know, is only a shadowgraph, and never a clear photographic expression of the true pathologic condition. It is for this reason that distortions due to different density of structures and difference due to angles of focus, are often responsible for wrong impressions. It is for these reasons also that infected areas are sometimes permitted to pass unnoticed by the x-ray.

It is a known fact that in some of these unrecognized foci of infection, the

most danger lies. This is more than true when the patient has been informed that the x-ray shows nothing, when as a matter of fact the foci of infection may be there, and the cause of considerable or all of the systemic trouble present. So it behooves the roentgen operator to use every precaution in obtaining the very best radiograms so as to be enabled to give a correct scientific diagnosis. Very often, the size of the darkened area above the apex of a tooth is taken as an indication of the amount of harm that might result. This is indeed entirely wrong, as oftentimes the most virulent infections are found in the smaller area. And then again, an area of increased transparency, instead of meaning that it contains an active infection, may contain a granuloma in which the infected area has undergone the process of repair or may still contain infectious matter, ready to become active upon the slightest irritation.

It has been stated by Schuhmann, that certain sinus shadows over teeth are often caused by drugs employed in treating and devitalizing teeth; these drugs acting as strong escharotics and causing a coagulation of lymphoid matter over the root end which appears as a shadow over the apex of the tooth. So using all the care and skill one can in making a diagnosis on dental radiograms, he will still make a few mistakes. I am of the opinion that no one should pass judgment on a set of radiograms without first seeing the patient or having a full history of the case, and that more definite results will be obtained if the radiograms are studied after a careful examination of the oral cavity and surrounding tissues, taking into consideration the general systemic condition of the patient.

It is now considered a positive fact that no matter how well teeth are treated and how well the root canals filled, there is still some element of doubt as to whether or not there may be some hidden infection present and Rosenow makes a statement to the effect that every devitalized tooth has an area of lowered resistance about the root end and should be considered unsafe.

Beginning or inflammatory changes of bone infection are not discernible in the radiogram as it does not at once produce gross bony liquefaction. After several days or weeks there is sufficient decalcification for recognition; so when an area is found over an apex, it is hard to determine the length of time infection may have been present.

I will mention a few conditions in which I believe infected teeth should be removed rather than treated.

Third molars, around which will be found pockets harboring bacteria, due to the fact that there is usually not enough space to completely erupt, and the tissue overlies the enamel surface but can not attach.

All pulpless teeth over which there is a cyst, removal is usually necessary and also the entire cystic membrane, to prevent too great a loss of bone due to the continuous pressure of the cyst wall on adjacent structure and often becoming secondarily infected, causing a great deal of trouble.

Teeth which have been treated and the walls of the canals perforated, the usual result being an alveolar abcess, should be removed.

In the process of treating teeth, one often encounters a condition where it is impossible to gain access to the infected area through the root canal, due perhaps to the fact that a phalanx of cement has been forced into the canals

which can not be removed, also broken broaches are often met with high in the root which can not be taken out, so the tooth should be extracted.

Teeth infected from pyorrhea, where the radiogram shows the bone structure gone to any great extent, should be extracted, as should most teeth which show a definite area of infection on a patient who is showing evidence of the absorption of toxins.

In conclusion I wish to say, as a result of information gained through the use of the x-ray, that teeth should not be devitalized so promiscuously as a few years ago, but an effort made to save every vital pulp possible.

DISCUSSION

Dr. Carl C. Johnson, Memphis, Tenn.—I did not know until I came here that I was scheduled to open the discussion on this paper. I feel unqualified to discuss the subject of radiography, as I know nothing about it. However, I enjoyed the paper very much.

Dr. T. E. Purcell, Kansas City, Mo.—I wish I might have had a chance to read this paper before discussing it, because I feel that the author of this paper is dealing with a subject that is rather dangerous to the average dental practitioner.

From this paper, the indications are that in the near future we shall not be leaving any teeth in the mouth for reparative work. The men who are here today, like myself, have practiced in a general way for some time, and we recognize the fact that we have various lesions, such as those spoken of in the paper, with which to contend in our everyday practice. If you take out every tooth that is infected by pyorrhea or is involved by an alveolar abscess, you are taking out teeth which should challenge the ingenuity of the dental profession to save. The mere extraction excludes from the dental profession the use of that skill which its members possess and are supposed to have in order to correct the conditions mentioned.

We are very apt to let the pendulum swing too far on the question of wholesale extraction of teeth. It is the most dangerous phase the profession has to face. We have extraction specialists in all large cities to whom the average family physician, when he can not find any cause for the condition he is treating, sends his patient with the advice that all teeth be extracted. Then, later, if the patient's health is not restored, something else is resorted to. It is a good deal like what is done in Texas—they shoot negroes and say halt afterwards. (Laughter.) A great many physicians advise extraction after seeing a radiogram of a tooth which is abscessed or where there is an absorbed area below the end of the root. Yet there are many of these cases which have yielded successfully to treatment, although it takes several months before new deposit of bony structure will resist the ray enough not to show the absorbed area. Taking the picture of a tooth at once after it is treated for an alveolar abscess is not fair to the operator and does not mean that there will not be repair of the tissues afterward.

I am one of those who believe that the treatment of pyorrhea is more or less mechanical, and that very little is accomplished by the use of serums and with drugs. I am reminded of the case of the lady from Atlanta who went to her family physician with the complaint that there was something the matter with her nerves, and that her teeth were loose. He said he could fix her teeth. She made visits to his office and was given a course of hypodermic injections of emetin, but her teeth remained loose, and when she so informed him he said, "It is strange, I never had a case of that kind before that was not cured." She told him her teeth had been loose ever since she had them made more than a year before.

We must use sound judgment in the treament of all our cases if we save our patient from being toothless, and also we must not allow the medical profession too much leeway by having these cases go from the family physician to the extraction specialist. Surgery is just as dangerous in the hands of some men. Because a patient comes with an infected finger, the surgeon would not cut off the hand. I believe it will not be long until the medical men and dentists together will learn to handle these cases in the proper way.

The orthodontists have seen the necessity of keeping all the teeth if it is possible to do so. There is a combination of circumstances here that is hard to remedy, but except in extreme cases, we must not recommend that the teeth be extracted at once.

I should like to hear other members discuss this paper and the treating of these cases by different means than the wholesale extraction of teeth.

Dr. E. G. Weeks, Saginaw, Mich. (closing for the essayist).—Dr. Purcell is a fine looking fellow; he is progressive, but he is on the wrong track. Dr. Purcell has a wife. If I came along with a pistol and pointed it at her, he would not know whether it was loaded or not, and yet I am sure he would make an effort to knock it out of my hand. Now, how does he know what areas are infected and what areas are not?

Dr. Purcell.—I don't know.

Dr. Weeks.—You say you don't know. Maybe you have not followed the work of Dr. Price of building in new bone in rarefied areas. Dr. Price showed slides and moving pictures of the case of a young lady who came to his office when the x-ray first came out. She had two large rarefied areas over a bicuspid tooth. Dr. Price in his general practice condemned root canal work. He went to work and filled this tooth and followed it up with x-rays, and felt proud of his job. He filled this tooth clear to the apices. In four or five months he took another picture and found the area filled with new bone. He was prouder than ever of his job. He talked about it before societies and of how new bone was built in there. Sixteen years later he went with the National Dental Research Commission, and in the meantime this patient also moved to Cleveland. He came in contact with her; one day he phoned her as he had learned that she was a great sufferer from rheumatism. He was doing a lot of investigation along the line of root canal work and of infections around rarefied areas, and this woman came before his mind, and he called her up by phone. On arriving at his office he said to her, "Do you mind sacrificing two teeth for the benefit of science?" She replied, "I will do anything you want me to do." He told her that he was going to extract these teeth. He extracted the teeth and took both of these new bone areas that were filled in and grew beautiful cultures of the streptococcus group. He has done that many times since in other cases, and has found almost universally that there was an infected area in the new bone growth, that is, the apical area. If even 70 per cent of these cases are of an infected nature, have you any right to say which is infectious and which is not infectious? Have you any way of proving it?

Now then, we know what infection will do to the general system. You get away from the fact that there are men in dentistry who can restore these conditions. I should say, if we want to keep this pretty girl in a good condition, we had better extract the tooth or teeth with rarefied areas.

Dr. Rickert, of the University of Michigan, under Dr.Vaughan, has been making investigations along the line of root canal work, and he has yet to find a tooth without multiple foramina regardless of what tooth it is. They have one or more foramina. The dental students will enlarge the canals, ream them out, but do not go to the branches because they didn't know there were any branches. If you leave a minute particle of the pulp, it is dead tissue and you are certain to get infection arising from some one of the multiple foramina. Rickert says that he does not go down and take all the nerve out, but he takes out what he can from the coronal portion. He is following Percy Howe in that he is impregnating a portion of the nerve with the precipitate of silver. If it stops up the apical foramen, if it sets up chemical irritation, you have scar tissue and infection finds its seat in the scar tissue. I will venture to say that in five years the teeth will have rarefied areas and they will be extracted.

This paper speaks of the infallibility of the x-ray. That is true—at least it was true in my own case. I always give my patients a chance and try to save their teeth, if it is possible to do so.

In my own case I had my assistant make an appointment for me and I could not get that appointment. Finally, I had a heavy feeling in this side of my face (indicating); I went to an exodontist who took hold of my case and removed three of my teeth. I have

at least one hundred x-ray pictures in my own office of my own case and there are no rarefied areas in any of the teeth. On the lingual side of the buccal roots and lingual roots there was found a large mass of pus which I had been absorbing. The x-ray did not show it.

Dr. Purcell says we are taking away from the dentist his rights or his professional ability. I will say to him and to the other fellows, if you do not get busy and practice prevention, physicians will send patients to the extractor, and I believe most of us should go to the extraction specialist instead of having ionization or ironization.

Dr. T. E. Purcell, Kansas City, Mo.—Dr. Weeks and I can cross wires with the best of feeling in the world and continue to do so as long as we continue to come to these meetings. I still maintain, Mr. President, that Dr. Weeks' position is wrong from every angle of professional practice. It is wrong because I could take Dr. Weeks to a bacteriologist and have him take a culture from his tonsils and find tubercle bacilli and probably diphtheria bacilli, and yet it would not mean that he was going to die either of tuberculosis or diphtheria. We must consider the theory of ionization.

I heard Dr. Price tell the story of the patient with rheumatism, and that he cured her by the extraction of these teeth, and I dare say that millions of teeth have been extracted since that time to cure rheumatism, but it has not always cured it. The dental profession has the inherent right to work this matter out to their own salvation. I do not believe in sacrificing teeth unnecessarily. I have read the articles of Dr. Price and those of Rosenow, and while they have come to the conclusion that such and such is the case, in ten years from now they may take the opposite view. They have to change their minds, which, of course, they have a right to do. The dental profession has a right to take care of the dental organs and to find out the cause and correct it, if possible.

I agree with Dr. Weeks in regard to preventive dentistry. I agree with him that the profession is lame on that phase of the subject, but whenever we come to the time and say that because we have a dental lesion the teeth must be lost, the dental profession and orthodontists are lame ducks. They are not doing their duty to humanity. Every case of rheumatism is not caused by infected areas around the roots of teeth.

I have heard Dr. Rhein and Dr. Price lock horns on ionization, and that according to Dr. Rhein, Dr. Price denying it, ionization would remove any danger of infection. We shall never get the human body free from infection, but we have immunity. If the theories built up in such papers as we have heard are maintained, there would not be a human being in this room. We would have been dead long ago. The dental profession must solve the problem, but not solve it by extracting the teeth.

Dr. Weeks.—The problem will be solved in my judgment by the extraction of the teeth until such time as it can be proved that the teeth do not cause damage to our health.

ABSTRACT OF
CURRENT LITERATURE

Covering Such Subjects as

ORTHODONTIA — ORAL SURGERY — SURGICAL ORTHODONTIA — DENTAL RADIOGRAPHY

It is the purpose of this JOURNAL to review so far as possible the most important literature as it appears in English and Foreign periodicals and to present it in abstract form. Authors are requested to send abstracts or reprints of their papers to the publishers.

Myristica (Nutmeg) in the Treatment of Pyorrhea Alveolaris Associated with the Parasitic Endameba. L. Leidy. The Dental Cosmos, 1919, lxi, No. 4, p. 295.

The use of myristica (nutmeg) is recommended by the author in the treatment of pyorrhea attended with endameba in the secretions and in scrapings from the seat of infection. On the basis of recent experimentation, nutmeg would seem to be a preparation well worthy of trial. Very gratifying changes have been produced in the appearance of the gums, with lessening of the discharge and tightening of the teeth, while the secretions and the scrapings from about the soft parts have been rendered free from any form of ameba. Grated nutmeg containing the volatile oil should be administered in 30 grain doses, after meals, without the addition of water. The patient should be instructed to chew thoroughly before swallowing and to take the last dose before retiring, allowing the preparation to remain in contact with the gums during the sleeping hours, the treatment thus being both local and constitutional. For adults, 30 grains of the grated nutmeg is an average dose and may be used with impunity. The duration of treatment should be extended from two to three weeks, during which time microscopic examinations should be made at frequent intervals, until the parasites have been made to disappear by the action of the remedy.

Erythrophlein Hydrochlorid as an Agent for Devitalizing the Dental Pulp. N. Black. The Dental Cosmos, 1919, lxi, No. 4, p. 296.

Being impressed by the wonderfully speedy, painless action of this drug, the author strongly advises all operators to test its worth for themselves, remembering that it is a very powerful drug, and therefore, to be handled with caution and respect. The technic of the employment of erythrophlein for the devitalization of pulps is similar to that carried out when arsenic is the drug used. With a weak, warm alkaline antiseptic wash away all debris. With sharp instruments cut away as much carious dentine as can be removed without causing pain. Do not especially seek to expose the pulp. Isolate the tooth, and de-

hydrate it with chloroform. With warm air evaporate all moisture, and the cavity is ready for the application. Take an extremely tiny pellet of cotton (as small as can be conveniently handled in dressing tweezers), dip it in throphleol and apply to the center of the floor of the cavity. A mere smear of the drug on the floor will act quite efficiently and is best in very shallow cavities. Do not apply the dressing direct to the exposure if it is an old one, but rather to the dentine at a little distance from the exposed spot. Seal in the dressing carefully with a water-tight temporary filling, such as one of temporary gutta-percha or calxin. Leave the dressing *in situ* for forty-eight hours, and then proceed as after devitalization by any other method.

There are three classes of cases in which the author considers the use of erythrophlein as justified and even indicated: (a) Shallow cavities which have produced considerable pain, and therefore, call for devitalization. (b) Pulps requiring destruction in the mouths of patients so sensitive that they will permit no operative measures until the tooth is free of sensation. (c) Where drug devitalization must be accomplished speedily. (d) Devitalization in mouths where other methods have proved unfortunate.

The two outstanding features of the use of this drug for devitalization are the speed of its action and the minuteness of the dosage. Twenty-four to forty-eight hours after its exhibition, in a favorable case, the pulp is usually a white bloodless thread. The drug presumably has a special and rapid action on nerve and nerve-like tissues, seeing that the action is as satisfactory when the application is made far away from the pulp as when the devitalizing agent is placed close to it.

Infectious Complications After Dental Extractions. Dr. Keraudren. Journal des Practiciens, 1919, xviii, p. 281.

Dental extractions under local anesthesia are not uncommonly followed by a special localized infection. On the day following the extraction, the affected region becomes congested and very painful, under progressive development of a hard swelling, apparently continuous with the bone, especially in the case of the lower jaw. Fluctuation and discoloration of the skin are absent; the pain is most severe at night, so as to prevent sleep. Examination of the mouth shows neither swelling nor incipient abscess formation around the tooth socket or in the gingivolabial fold. These symptoms persist from eight to ten days, sometimes a little longer, and gradually subside without softening having been demonstrable at any time. When located in the upper jaw, the pains sometimes resemble typical attacks of facial neuralgia. Ordinary analgesic remedies are not as a rule very helpful, the best treatment consisting in the application of hot compresses and irrigation of the mouth.

These complications are referable to periostitis of infectious origin, through imperfect asepsis, the dental syringe being usually responsible; for dental syringes which can be completely sterilized, do not exist. It is advisable to keep the syringe, or rather its separate components, in a solution of formol, or in a flask of chloroform. Another cause of infection through local anesthesia is found in the habit of certain dentists to keep in stock a flask of their favorite

anesthetic and to insert the syringe in this flask, as required. Under these conditions, it is difficult to keep the solution sterile for any length of time, the flask being constantly reopened and the extremity of the syringe not always sufficiently sterilized before insertion. Solutions of cocain and its deviates must moreover be freshly prepared, as otherwise, they favor the onset of infection. The risk of infection through the fluids of the mouth is advantageously diminished by lightly painting with iodine tincture the parts where the needle is to be inserted. Finally, after the tooth has been extracted and the bleeding controlled, the empty alveolus may be irrigated with a little oxygenated water or a weak solution of hydrogen peroxide. By observing all these precautions, including, of course, the ordinary asepsis of the instruments, the above described infectious complications after dental extractions can be avoided with a fair degree of certainty.

Diseases of the Mouth as Focus of Metastatic Affections. De Vecchis. La Riforma Medica, 1918, xxxiv, No. 4, p. 71.

In this analytical review of the corresponding literature, the author calls attention to the different localizations of metastatic and general diseases of buccal origin in the blood and vascular system, in the glandular system, in the gastro-intestinal apparatus, in the joints, in the respiratory system, in the skin, in the nervous system, and various other affections, such as epulis, cancroids, and sinusitis. Relations have been established between preexisting lesions in the mouth cavity and malignant tumors. Dysphagia and dysphonia of dental origin have been described. A variety of diseases of the internal ear have been referred to oral sepsis; likewise, retropharyngeal abscesses and a few diseases of the eyeball. Lymphangitis, inflammation of the submaxillary and sublingual glands, adenophlegmons, may be observed as metastatic localizations of buccal infection and intoxication. The Italian literature contains references to two cases of cervical phlegmon and a case of abscess in the subclavian region, shown by radiography to be derived from dental caries of the fourth degree and alveolar osteitis. Bright's disease has repeatedly been traced to pyorrhea alveolaris. Oral microbes may penetrate into the stomach and intestine, causing dyspepsia, gastric catarrh, ulcer of the stomach or duodenum, enteritis, and mucous colitis. Cases of acute appendicitis of alveolar dental origin, have been reported. The joints may be affected in the form of acute articular rheumatism and arthritis deformans. Arteriosclerosis, aside from the known pathogenic factors, may depend upon toxic disturbances induced in the composition of the blood through oral sepsis.

Two Cases of Dislocation of Teeth. H. Mearns Salvery. The Lancet, London, 1919, i, p. 339.

Replacement of dislodged permanent teeth is advocated by the author, on the basis of two favorable experiences in youthful individuals. He was unable to find any literature on the subject, nor has he heard of similar treatment being adopted in the same circumstances. The first patient, a boy of thirteen years, as a result of an accidental blow in the mouth from a stick, suffered a complete

dislocation of his two upper central teeth, which hung loose in the mouth and dropped into the author's hand on being touched. Considerable laceration of soft parts and loosening of adjacent teeth was present, the parts were cleansed with a solution of flavine (1:1000) and all bloodclots were removed from the cavities. The two teeth, which were not broken in any way and had been temporarily placed in saline, were then replaced, the laceration of the gum necessitating a few points of silk suture. The patient was furnished with a lint pad to bite on, and the jaw was held up fairly tightly by a jaw bandage. Fluid diet only was allowed. Pad and bandage were kept on for 48 hours, ensuing treatment consisting in fluid diet and thorough cleansing of the teeth and mouth twice daily with swabs soaked in a flavine solution of the strength stated above. In five or six days solid diet was gradually given. Six months later, the condition was found to be quite satisfactory; the patient for some time had been able to bite apples and tackle hard crusts with no discomfort.

The second observation concerned a youth of 18 years, who was kicked in the mouth while playing football. The first and second bicuspid and first molar teeth of the right upper jaw were turned almost upside down, the crowns being forced up and separating an appreciable portion of the alveolar margin. The author did not take away the teeth, there being a considerable attachment of gum. The parts were cleansed as in the first case. The restoration of the "bite" was more difficult in this instance, owing to the destruction in the continuity of the alveolar margin. After considerable manipulation, this was accomplished and after treatment instituted as in the first case. The patient was discharged some time afterwards. The only fault in an otherwise perfect result was that two of the teeth were a fraction lower than previously, but this caused no inconvenience.

Intra-oral Skin Grafting. The Establishment of the Buccal Sulsus. H. P. Pickerill. **Proceedings of the Royal Society of Medicine. Section ot Odontology, 1919, xii, No. 3, p. 17.**

The author emphasizes the necessity for adequate buccal and labial sulci, for the proper performance of mastication as well as speech, on the part of the jaw, lips, tongue and cheeks. Adequate sulci are likewise a requirement for the wearing of stable artificial dentures. Obliteration of the buccal and labial sulci, actual or relative, may occur as the result of a variety of general causes, notably excessive atrophy of the alveolar processes; hypertrophied buccal and labial frena; ulcerations due to alveolar abscesses, ulcerative or gangrenous stomatitis. War wounds of the jaws through gunshot projectiles were almost invariably followed by adhesions between the lips and cheeks and jaws, with obliteration of the buccal sulci and resulting difficulty in plastic restoration of the lips or in adjustment of an artificial prothesis.

To the older, more or less unsatisfactory methods of treatment of this condition, the author adds his original procedure of intra-oral skin-grafting. Based upon a number of considerations, including his experience in other skin-grafting operations, that pressure, even and continuous, the obliteration of dead spaces, seems to be the most essential factor for a success, the skin grafting of a re-

established buccal sulcus was done by him directly into the mouth and under pressure, with immediate and most gratifying success. The method has been utilized by him since February, 1918, without a single failure. Given accurate technic, the establishment of the sulcus and the skin-grafting of its surface will be certain in every case. General or local anesthesia may be used as indicated in each particular case. In view of its uniformly good results, the method is recommended in the treatment of gunshot fractures of the jaw as well as for many cases occurring in civilian practice.

Method of procedure for intra-oral skin grafting: When adjacent teeth are present, an appliance similar to a dental splint, constructed previously, is used with advantage. This appliance carries an arm attached to it by screws, and to the arm is attached a perforated shield which will approximately fit in the sulcus when established. An incision is made dividing the adhesions, keeping the knife close to the bone. Bleeding is arrested. The shield is covered with modelling composition and an "impression" obtained of the raw area of the sulcus. This is removed. A Thiersch skin graft is cut from the arm or leg and placed raw surface upwards upon the impression of the sulcus, it is smoothed down flat and passed up into place and the arm secured by the screw provided. Thus the skin-graft is pressed evenly into all the unevennesses of the sulcus, and maintained there with constant pressure. When no teeth are present, the procedure is the same in all particulars except that the "impression" is ligatured into place and maintained there with circumferential silk-worm gut ligatures in the lower jaw or by passing sutures through the palatal mucoperiosteum and cheek or lip in the upper jaw.

Displacement of the Mandibular Meniscus and Its Treatment. Hosarth Pringle. British Journal of Surgery, 1919, vi, No. 23, p. 385.

Four cases of this uncommon but extremely distressing condition came under the observation of the author, who personally suffered from the displacement, the meniscus acting as a foreign body and preventing complete closure of the mouth. In order to understand and correct the mechanism of the displacement, the anatomy of the meniscus must be mastered more thoroughly than is possible on the basis of textbook descriptions. The disc presents a central thickening in the coronal plane over the summit of the condyle of the jaw. In front of the ridge is a distinct depression in the disc which fits the tuberculum articulare of the temporal bone, while below and anterior to this is a second thickening, which forms the anterior border of the disc and has the external pterygoid muscles attached to its lowest part. The posterior portion of the disc trails off from the thick coronal ridge, and lying in close contact with the posterior surface of the condyle, becomes lost in the fibrous tissue of the capsule of the joint. In the author's opinion, displacement of the meniscus is usually due to overaction or irregular action of the external pterygoid muscle, the disc becoming dragged askew. It goes forwards and inwards, so that its thick central ridge becomes placed obliquely instead of lying in the coronal plane. After displacement the disc acts as a foreign body, being either caught between the condyle and the tuberculum articulare or moving with the condyle and preventing

the latter from clearing the articular eminence. Displacement usually occurs during yawning or sneezing, or in forcible opening of the mouth by a gag as in dental extractions. The mouth can not be closed completely, and efforts to do so cause severe pain in the regions of the joint, with the sensation of a foreign body interfering with the movement.

The displaced meniscus may remain in its abnormal situation for days at a time until reduced, or it may slip in readily and be subject to repeated displacements. Reduction can usually be accomplished by keeping up strong pressure behind the condyle with the mouth open, and then slowly closing the jaw.

Recurrent displacement of the meniscus is associated with well-marked relaxation of the tissues, ligaments and muscles around the joint, so that it is impossible to maintain the disc in position, and operation is required. Under these conditions, the loose disc may be sutured to the periosteum, as was done by Armandale in two cases. Excision of the displaced meniscus, with satisfactory results, was performed in one of the author's cases, concerning a young woman twenty years of age, whose left mandibular meniscus was remarkably loose and could be dragged freely over the condyle in whatever position the mandible was placed.

The Early Diagnosis of Lead Poisoning. G. L. Apfelbach. The American Journal of the Medical Sciences, 1918, clvi, p. 781.

With special reference to the blue line, the deposit of lead sulphide on the margin of the gums occurs only when there are teeth and when they are ill kept. The line has a grayish-black tinge, the surrounding gum being somewhat bluish, as in Chadwick's sign of pregnancy. The occurrence of a blue line on the gums indicates metallic absorption and does not always indicate the use of lead, nor does this blue line indicate illness or disability, nor does its absence prohibit the diagnosis of lead poisoning. In the writer's series of 72 cases the lead line was observed in only 36.1 per cent. Lead not only produces this characteristic phenomenon on the gums but seems to destroy the teeth so that one will see lead-workers more often with decayed teeth and pyorrhea than with a lead line. In 150 painters a blue line was observed only 5 times, loose teeth 32, decayed teeth 52, and pyorrhea 32 times, only eleven painters were observed with good teeth. This condition is not seen in other trades of the same nationalities, habits, house and living conditions.

The Etiologic Importance of Dental Infections. Barrymore Marco. American Medicine, 1919, No. 5, p. 286.

Apical infections or blind abscesses have been responsible, in the author's experience, for many diseases, including ailments in parts of the body at a great distance from the teeth. Gastrointestinal disturbances, appendicitis, heart disease, arthritis deformans and rheumatic fever, diseases of the blood-making organs, nervous diseases, such as neuritis and paralysis, are represented among the pathologic conditions induced by infected teeth. A highly instructive case, illustrating the far-reaching consequences of apical infections, recently came under the author's observation, concerning a patient of fifty years, whose right eye

had been removed about two years previously. On account of failure of vision in the remaining eye, he consulted a specialist on whose advice radiograms of his teeth were prepared. A well-defined apical abscess was discovered at the root of the upper right canine, which carried a pivot. After extraction of the offending root, a virulent growth of streptococci was obtained by cultural methods. The patient was treated with an autovaccine in the form of injections, assisted by other internal treatment including potassium iodide, and the condition of the eye gradually improved together with the general health.

Root Canals or Not. G. L. Junkerman. Dental Facts, 1919, vii, p. 15.

While not contending that satisfactory root canal work can not be done the author feels assured that it is not being done. At the present state of our knowledge, a root canal perfectly filled is the result of accident and not the result of an exact science. There is no field in which curative dentistry is so lame as in sterilizing and filling root canals. His observations lead him to believe that the thinking element of the profession is not trying to save as many teeth, crippled by neglect, as it did a few years ago. Public health is being better served by this seeming sacrifice of teeth. Dentistry is one of the most exact sciences of public health. If there is any part of it not so, justice to ourselves and the public demands that we discontinue that part of it until research has made it so. This is the very thing that many dentists are doing with root canal work, realizing that they can not sterilize and fill root canals successfully.

Absorption of Teeth in Dermoid Cysts. E. Marthaler. Inaugural Dissertation, Zurich, 1919.

The occurrence of teeth outside of the buccal cavity, aside from teeth retained in the jaw, is not of much practical importance for the dentist, but considerable scientific interest is attached to this question. Such teeth are found most frequently in dermoid cysts, and among these especially in ovarian dermoids; the literature contains records of a large number of tooth-bearing cysts. The structure of these teeth, when fully developed, differs in no way from the structure of the teeth in the mouth cavity. Anomalies in form, enormous variations in number and size, anomalies in position and eruption have been demonstrated. Histologically these variegated toothlike structures present a variable degree of development. For the most part, these teeth are solidly wedged into a bony base, although some are found floating free in the cyst fluid. As a rule, a normal pulp is present; more rarely, the pulp is imperfectly developed, and very exceptionally it is altogether absent. Teeth of the first, as well as the second dentition have been met with in dermoid cysts.

It is a remarkable fact that in a number of these teeth, destructive lesions and excavations have been found, which are often strongly suggestive of the appearance of diseased teeth. Up to the present time, with few exceptions, all cavities in teeth in dermoid cysts were simply designated as caries. However, the author's examination of a case of excavated teeth from a dermoid cyst has established the fact of the condition being due, not to caries, but to absorption.

This statement is based on the following considerations: (a) No zone-formation is demonstrable in the decalcification; (b) The cavities contain innumerable absorptive lacuna which are entirely uniform with the lacuna seen in the absorption of the milk teeth and the permanent teeth in the mouth.

Finally, microorganisms are altogether absent in or around the cavities. The pathologic changes are accordingly produced by way of internal properties on the part of the teeth, instead of external causes of disease such as bacteria. The existing cavities were evidently the result of absorption, not of caries. The characteristic absorption lacuna were distinctly demonstrable in all the hard dental substances. The absorption in this particular instance undoubtedly originated from the outside, from the elastic tissue covering the teeth, instead of from the pulp tissue; for a communication between the latter and the cavities was either entirely absent, or so minute in proportion to the defect as to indicate the probable origin of the defect from within.

Effect of Feeding with Oats on the Tongue of Rats. K. Secher, Hospitalstidende, 1918, No. 43.

When rats are fed for some months exclusively with oats, inflammatory tumors make their appearance on the tongue of these animals, caused by the fine hairs attached to the husks of the oats. This experiment was originally performed by Stahr, who was unable, however, to repeat it successfully. The author, on the contrary, had positive results and was enabled to confirm the observations of his predecessor, in every detail, macroscopically, as well as microscopically. He likewise arrived at the conclusion that this inflammatory tumor, although its checkered epithelial proliferations are extremely suggestive of a carcinoma, must be interpreted on inspection of serial sections as a simple inflammation. The process heals as soon as another, nonirritative, diet is adopted. On the other hand, one of his rats died of a genuine undoubted carcinoma after the feeding with oats had been stopped. The tumor is interpreted by him, not as a simple continuation or advanced stage of the inflammation, but as a complication of the inflammatory process. In view of the fact that only one of the sixty laboratory animals was attacked by carcinoma, the existence of an individual predisposition would seem to be involved.

Treatment of Trismus During Sleep. T. Morineau. La Restauration Maxillo-Faciale, 1919, iii, No. 1, p. 43.

The author discusses the treatment during sleep, of persistent locking of the jaws. Some of these patients are in no hurry to be cured, and it is essential to a successful outcome that their conscious or subconscious resistance be overcome by means of very gentle mechanical measures applicable during sleep, when, moreover, these measures are facilitated by muscular relaxation. The treatment devised by him consists in the patient's wearing an intrabuccal extension apparatus which exerts a force gentle and painless enough not to prevent his falling asleep, while its continuous action finally overcomes the cicatricial retraction and the muscular hypertonicity, aided by the unconsciousness of sleep with its associated muscular relaxation. While the apparatus for cor-

rections can be varied to meet individual requirements, the principles of rational mechanical and surgical treatment remain the same, and their application yields excellent results in the majority of cases. The condition is almost invariably due to psychological influences in the form of doubt and fear, engendering a strong opposition against recovery on the part of the patient, and these interferences are successfully ruled out through mechano-therapeutic treatment during sleep. The author's intra-oral apparatus works through the action of dilatators in the form of rubber rings and hooks which distend the cicatricial tissue and gradually open the mouth. Once accustomed to this apparatus, patients readily go to sleep and at the end of about a month's treatment, the mouth can usually be opened spontaneously to a sufficient extent.

What Basic Principles of Physiology Are Involved in the Destruction of Bacteria without the Destruction of Tissue Cells? D. G. Stine. The Dental Summary, 1919, xxxix, No, 3, p. 199.

The author briefly discusses the sterilization of the mucous membranes of the mouth and the soft tissues about the teeth, as well as the sterilization of the field of operative invasion or diseased cavities within the tooth or in the maxillary bone; arriving at the conclusion that there is not to his knowledge any process that will kill bacteria in infected bone without destroying bone cells. Some bacteria are out of reach of any agent that does not destroy the bone coming in contact with them. Where there is suppuration of the soft tissues around the teeth, the method of Carrel-Dakin, namely, the laying open of pus pockets and irrigation with dichloramine solution, or the application of a dichloramine paste, is the only procedure he knows of that can sterilize the pus pockets and not harm normal cells. It has been proved that young tissue cells will grow in this solution and that bacteria are killed by it. Only a chlorine-liberating agent, as in the hyperchlorous or dichloramine solutions mentioned, will kill the bacteria without damaging tissue cells.

Erythrophleum Hydrochloride as an Agent for Devitalizing the Dental Pulp. N. Black. British Journal of Dental Science, 1919, lxii, No. 1, 215, p. 71.

The two outstanding features of the use of this drug for devitalization are, first, the speed of its action, and second, the minuteness of the dosage. Whereas the time required for complete action of an arsenic dressing is seven days, erythrophlein hydrochloride accomplishes about the same result in thirty-six hours. Its action is startling in its rapidity and usually free from anything more than the merest suggestion of pain. The preparation used by the author is known as throphleol, consisting of a 50 per cent solution of erythrophlein in eugenol. The employment of this preparation—which is excellent for the treatment of sensitive dentine—for pulp devitalization is indicated, in the author's opinion, in four classes of cases, as follows: (a) Shallow cavities which have produced considerable pain and, therefore, call for devitalization. (b) Pulps requiring destruction in mouths of patients so sensitive that they will permit no operative measures until the tooth is free of sensation. (c) Where drug devitalization

must be accomplished speedily. (d) Devitalization in mouths where other methods have proved unfortunate.

The technic of the employment of erythrophlein for the devitalization of pulps is similar to that carried out when arsenic is the drug used. Pulps affected by chronic inflammation react less satisfactorily to this drug as well as to arsenic, than pulps unaffected by degenerative changes. (Erythrophleum, sassy-bark, casca bark, or ordeal bark, is the bark of Erythrophleum guineense. The hydrochloride occurs in yellowish-white granular crystals easily soluble in water.)

Headache Related to Oral Sepsis. W. W. Duke. **Dominion Dental Journal, 1919, xxix, No. 2, p. 43.**

Chronic infections, especially those in the alveolar process, are relatively frequent causes of chronic headache. Defective teeth may be responsible for headache in several different ways: They may be sources of arthritis in the cervical spine, of myositis in the muscles of the neck, or of inflammatory processes in the bursæ, in the tendon sheaths, or at the points of attachment of the tendons to the skull and cervical vertebræ. All these conditions may give rise to pain in the back of the neck reflected upward over the skull. In other cases, oral sepsis may be a source of neuralgia or neuritis in many or all of the branches of the facial nerve. Occasionally, headache is a referred toothache, which may be severe enough to suggest brain tumor. Finally, an alveolar abscess may rupture into the antrum of Highmore and cause headache, with local symptoms so slight as to escape notice. Illustrative cases belonging to the first, second, and fourth groups are described by the author, in all of which relief of the long-standing headache was obtained by means of appropriate dental treatment.

Mucus and Oral Hygiene. L. Sim Wallace. **Medical Press, 1919, N. S. 107, p. 179.**

The author emphasizes the fact that the essential function of the oral mucus is for the hygiene of the mouth. The peculiar properties of mucus, physical as well as chemical, render it "ingeniously suited for keeping the mouth free from the undue lodgment of particles, when the foods are not converted by artificial means into some bland pap-like form which stultifies efficient mastication and negatives considerable friction." The mucus has not only the power of facilitating the removal of food particles and shreds which have been disintegrated by mastication, but it has also, under certain dietetic conditions, the property of being disintegrated and carrying its own disintegrated self away.

Instead of accepting the customary views as to the supposed function of the oral mucus in protecting the food against the acid gastric juice, the author regards it as much more probable that the thorough incorporation of food with mucus facilitates the penetration of the hydrochloric acid throughout the whole of the contents of the stomach after a meal, and he suggests that this is possibly one of the reasons why a meal of such a physical consistency as demands mastication is more quickly and satisfactorily digested than a meal of a similar nature which has been reduced to a pap-like form before it is taken into the mouth.

Physiologists, judging from the contents of their textbooks, do not yet apparently realize that oral hygiene is a physiologic process, and that all the glands opening into the mouth, together with their secretions, are specially adapted for the maintenance of oral hygiene, and that these secretions are scarcely, if at all, of importance for any other function.

The Important Blood Vessels and Nerves Involved in Periapical Treatments and Operations. J. F. Alcorn. The Dental Summary, 1919, xxxix, No. 3, p. 197.

The teeth of both jaws, the pulps, the pericementum, the periosteum, the alveolar processes, and the gum tissue receive their blood supply from the external carotid artery through the internal maxillary branch. The nerves to the same parts have their origin in the second and third divisions of the fifth cranial, the second to the maxilla, the third to the mandible. In the maxilla the molar region is supplied by the posterior dental artery from the alveolar branch of the internal maxillary, and the posterior superior dental nerve, both artery and nerve descending upon the tuberosity of the maxilla. Both split up and enter the bone through the same several foramina about 2 cm. superior and slightly posterior to the third molar. They supply the pulps and pericementum, the alveolus and buccal gum tissue in this region.

The lingual gum tissue or the posterior part of the hard palate is supplied by the anterior branch of the posterior palatine artery, and the anterior palatine nerve. Both traverse the posterior palatine canal, emerging at the posterior palatine foramen slightly less than half way to the median line and on a line with the third molars.

The superior bicuspids and the six anterior teeth are supplied by the anterior dental branches of the infraorbital artery and the middle and anterior superior dental nerve. Arteries and nerves take the same course; the infraorbital artery and nerve in the infraorbital canal slightly posterior to the infraorbital foramen, travel down the anterior wall of the antrum of Highmore to the teeth, alveolar process, and the labial gum tissue. The anterior position of the covering of the palate, or the rugæ is supplied by the internal branch of the sphenopalatine artery and the nasopalatine nerve, both emerging through the bone at the incisive foramen, just posterior to the centrals in the median line.

The mandible is supplied by the inferior dental artery and the inferior dental nerve. They enter the bone at the mandibular foramen on the internal surface of the ramus of the mandible. They supply the teeth and bone and the labial and the anterior part of the buccal gum tissue.

The buccal mucosa of the molars receives sensory nerve filaments and arterial supply from the buccal nerve and artery.

The lingual gum and the anterior lingual periosteum and alveolar process are supplied by the lingual artery and nerve given off from the inferior dental artery and nerve just before the latter enters the mandibular foramen.

With special reference to the periapical region, the author emphasizes that in youthful individuals the pulps of the teeth and the pericementum are com-

paratively large and vascular as compared to the conditions prevailing at a more advanced age, when the pericementum as a result of diminished blood-supply becomes less resistant against degenerative changes. The blood to these tissues, according to Stine, is distributed to the pericementum and by collateral circulation supplies the pulp. The nerves enter the pericementum and pulp canal by several trunks in the apical tissue.

The disposition of the arterioles in the pericementum insures nutrition to the peridental membrane in case of loss of apical tissue as in granuloma or apical abscess, and also insures a collateral blood supply to the pulp in case of loss of main arterial trunks, as for instance, in operations upon the inferior dental or infraorbital canal, in which case the pulps do not die.

Common Salt and Erosion: A Thesis. G. F. H. Bloom. British Dental Journal, 1919, xl, No. 8, p. 305.

Attention is called by the author to the fact that erosion has never been observed in primitive tribes in parts far removed from salt deposit or sea shores, where salt is not added to the diet. Common salt is not necessary to healthy existence in larger quantities than the percentage of natural salts in fresh fruits or vegetables. It is the largest chlorine builder in the diet. During the assimilation of salty foods the salivary content of chlorine is increased. The nascent hydrogen found in the mouth rapidly unites with the dissociated chlorine to form hydrochloric acid. The normal amount of hydrochloric acid present is increased in ratio to the amount of salt consumed. Patients with erosion show an unusual liking for salt or salty foods, and a real relationship exists between the condition of the erosion and the amount of salt consumed. Common salt is as direct a factor in the etiology of erosion as friction. To the palliative and preventive treatment of erosion should be added the strict limitation of salt either in cured foods or as table addition. The presence of hydrochloric acid in the mouth constitutes a tendency to softening of the dental tissues, which aided by vigorous mechanical agents, conduces towards the production of the striking lesion observed in erosion. Its stimulating properties account for the extreme sensibility of the dentine and cementum occasioned by the chronic irritation of the minute nerve-endings.

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EDITORIALS

New Orleans and the National Dental Meeting

NEW ORLEANS always has been light-hearted and gay and even in this cycle of industry when all the world is scrambling to forge ahead, the Crescent City still has a moment in which to entertain the strangers within her gates. To the delegates attending the National Dental Convention, New Orleans renews her pledge to make their visit long to be remembered. During the time business slacks, the visitors are assured a pleasurable time.

Never too hot, never too cold is a good way to describe the climate of New Orleans. Surrounded on three sides by water, the city enjoys a mild, moist brand of weather. In October the temperature lurks between a light chill and an Indian summer warmth and records show this month has a high average in the sunshine column. July is normally the warmest month and the average

yearly mean temperature for forty-six years is 55.6.° Only seven days in forty-three years have seen the mercury rise over 100, a record hard to touch.

This climate makes it possible to enjoy outdoor sports the year 'round. This is why New Orleans boasts a winter baseball league and games are played in December and January. New Orleans offers such sports as fishing; duck and snipe shooting in the marsh lands; tennis; golf; swimming; yachting; motor-boating; motoring the year 'round; horse racing; a galaxy of theatres, and the famous French Opera during the winter months. Under such weather conditions, visiting dentists may feel reasonably sure of conducting their golf tournament without interruption.

New Orleans is the greatest sea food market in the world, and for this reason the sport of fishing is unsurpassed in the lakes and bayous surrounding the city. Every variety of game and food fish abounds and a day of fishing in these waters will linger in the archives of memory.

The Metropolis of the South is primarily a city of fashionable clubs, fraternities and homes. The clubs include the Boston, the Pickwick, the Chess, Checkers and Whist, Southern Yacht Club, Country Club, Round Table Club, Audubon Golf Club, and the Louisiana Club. All of these have homes which will be thrown open to the visitors. The Elks have the finest club house in all Elkdom and it will be open to the visitors. The Shriners have just built a magnificent mosque and the Masons have a building in keeping with their national standard. The Knights of Columbus also occupy a prominent place among the lodges.

And, of course, there is always the French Quarter in which visitors may find the lights and shadows of yesterday—a truly wonderful place in which one might spend weeks without seeing everything. There is, however, quite enough within a stone's throw of Canal Street to excite the curiosity of the most blasé.

A trip along the River front will prove most enjoyable and it is almost certain that the Entertainment Committee will arrange something of this nature, there being several sight-seeing steamers docked here at all times. New Orleans has the greatest inner harbor in the world with 41 miles of frontage at which 80 ocean-going ships may berth at once. This includes the Inner Harbor Navigation Canal, linking the river and Lake Ponchartrain with a lock-level channel 30 feet deep, six miles long and which connects all railroads and steamship lines. Port facilities valued at $13,551,206 include steel sheds and docks covering nearly eight miles with 4,478,000 feet of covered floor space.

New Orleans has just completed a $15,000,000 army supply base warehouse of concrete construction—one of the greatest building projects in the history of the South. The warehouse covers 48 acres and has three units of the same design, each 140 by 600 feet, six stories high, with a two-story steel and pile wharf and warehouse 140 by 2,000 feet. Eight ships can be loaded simultaneously at this wharf.

Other sights to be seen include the Chalmette Battlefield, the American Sugar Refinery, the largest single unit plant in the world, the largest mahogany manufacturing factory in the world, the great municipal grain elevator and ninety-four parks with a total area of 905 acres.

New Orleans has seven Class "A" Hotels, which include the St. Charles, Grunewald, Monteleone, Lafayette, De Soto, Cosmopolitan and the Planters.

Preliminary Announcement of the 1919 Program of the National Dental Association, New Orleans, La., October 20-24, 1919

PROGRAM OF THE SECTION ON ORTHODONTIA AND PERIODONTIA

New Orleans, La., October 20-24, 1919

Tuesday Afternoon, 2:00 *P. M.*

"An Analysis of the Various Principles of Orthodontic Treatment that have been Advocated during the Last Fifteen Years."
By J. A. Cameron Hoggan.....
..... Richmond, Va.

"Necessity for Oral Prophylaxis and Radiology in the Practice of Orthodontia."
By F. M. Casto.....Cleveland, Ohio

"Observations upon the More Recent Developments in Periodontology."
By Arthur H. Merritt.....
.....New York, N. Y.

"Why the Field of Prophylaxis is Marked with a Lack of Enthusiasm."
By Dorothea A. Howes.....
.....Washington, D. C.

Wednesday Morning, 9:00 *A. M.*

"Plurality in Etiology of Periodontoclasia."
By John O. McCall....Buffalo, N. Y.

"What to Extract, and What Not to Extract with Reference to Infections Involving the Periodontal Membrane."
By Louis D. Corriell..Baltimore, Md.

"An Analysis of Case Characteristics with Reference to the Selection of the Most Efficient Form of Appliance for Treatment."
By A. H. Ketcham.....Denver, Colo.

"The Problem of Retention."
By C. A. Hawley..Washington, D. C.

PROGRAM OF THE SECTION ON OPERATIVE DENTISTRY, MATERIA MEDICA AND THERAPEUTICS

New Orelans, La., October 20-24, 1919

FIRST SESSION

"The Prevention of Chronic Mouth Infection."
(Illustrated with stereopticon slides.)
By Arthur D. Black.....Chicago, Ill.

Abst.—This paper will consider briefly the pathological changes which occur in cases of chronic alveolar abscess and chronic pericementitis, and will then discuss the causes and take up in detail the methods to be employed in operative dentistry for their prevention. Extensive studies of radiographs of root fillings will be reported, and means of simplifying pulp treatment and root-canal technic will be presented. Particular stress will be laid upon improvements in operative procedures to prevent peridental infection.

Discussed by
H. E. Friesell.....Pittsburgh, Pa.
A. H. Hipple.....Omaha, Neb.

"X-Ray in Dental Practice."
By C. Edmund Kells.....
.....New Orleans, La.

Discussed by
H. B. Tileston.....Louisville, Ky.
Howard R. Raper, Albuquerque, N. M.

SECOND SESSION.

"Some Recommendations for the Sterilization and Filling of Infected Roots."
By Weston A. Price....Cleveland, O.

Discussed by
Clarence J. Grieves....Baltimore, Md.
Percy R. Howe.....Boston, Mass.

"The Gold Inlay."
By R. H. Volland....Iowa City, Iowa

Discussed by
Wallace Wood.....New Orleans, La.
W. L. Fickes.....Pittsburgh, Pa.

PROGRAM OF THE SECTION ON HISTOLOGY, PHYSIOLOGY, PATHOLOGY, BACTERIOLOGY AND CHEMISTRY—RESEARCH

New Orleans, La., October 20-24, 1919

FIRST SESSION

"How Mouth Infection Affects the Kidneys."
By Thomas B. Hartzell.....
..... Minneapolis, Minn.

"A Phase of Dental Caries."
By Percy R. Howe.. ..Boston, Mass.
"A Biochemical Study of Bacterial Metabolism in Its Relation to the Denser Tooth Structures."
By Samuel E. Pond..Cleveland, Ohio

SECOND SESSION

"A Dental Histo-Pathological Study."
By Harold Box.....Toronto, Canada
"Physiology and Pathology of Special Interest to Dentists."
By J. J. Sarrazin...New Orleans, La.
"Studies of the Variations in Susceptibility to the (so-called) Rheumatic Group Lesions and to the Influence of Oral Focal Infections."
By Weston A. Price..Cleveland, Ohio

PROGRAM OF THE SECTION ON PROSTHETIC DENTISTRY AND CROWN AND BRIDGE WORK

New Orleans, La., October 20-24, 1919

Special Announcement

Owing to the fact that only two half day sessions can be given to this Section, it has been deemed best to dispense with long exhaustive general papers and discussions, as more definite information can be given by selecting men to cover as many of the vital phases of this branch of dentistry as possible, with a view to standardizing technical procedure. The audience will thus individually have the opportunity of either accepting or rejecting the teachings of the essayists.

In addition to the papers and illustrations, the essayists will give individual clinics in order that those who desire to meet and discuss details further with the clinicians may have this opportunity.

FIRST SESSION

Prosthodontia

"Scientific Interpretation of Muscular Control of Mandibular Movements."
By George H. Wilson..Cleveland, O.
Syn.—The dental profession and anatomists generally are not clear on this subject. Dr. Wilson has been doing research work along this line for some years, and is now ready to present his findings to the profession. Owing to the importance of this subject in its relation to denture construction we are fortunate to have it presented to us by a man of Dr. Wilson's ability and experience.
"Surgical Interference for Preparation of Malformed Edentulous Mouths for Construction of Dentures.
By James P. Ruyl....New York City
Syn.—Demonstrates technic, using motion pictures for removing protruding gum tissue, irregular alveolar process, and other deformities in order to simplify complicated cases by providing a firm foundation upon which to build artificial dentures that will be more efficient and more beautiful.

Crown and Bridge Technic

"Construction of Cast Clasps for Partial Dentures and General Consideration of Other Methods of Retention and Attachment of Vital Teeth for Removable Bridge Work."
By Louis J. Weinstein.....
.....New York City
Syn.—Mr. Weinstein's knowledge of the uses and abuses of metals used in dentistry combined with his technical experience enables him to present us with definite information on a subject of vital importance at this time.
"Porcelain Jacket Crown Technic."
By A. L. Legro.....Detroit, Mich.
Syn.—Demonstrates a definite technic for making this most esthetic, as well as most valuable prosthetic restoration for the conservation of the dental pulp comparatively simple.

SECOND SESSION

Prosthodontia

"Selection of Artificial Teeth for Prosthetic Restorations."
By P. C. Lowery.....Detroit, Mich.
Syn.—Clearly demonstrates one of the most important phases of dentistry which a large majority of dentists do not seem to appreciate as much as they should. The doctor shows that it is much simpler to harmonize tooth and face form than it is to adapt the face of your patients to your ideal tooth form.
"Correction of Malocclusion in Artificial Dentures."
By M. M. House....Indianapolis, Ind.

Syn.—Demonstrates with precision the highest type of efficiency in artificial dentures.

Crown and Bridge Technic."

"The Gold Shoulder Crown Technic."
By Wm. H. Elliott.....Detroit, Mich.
Syn.—This technic of the most widely used restoration in dentistry is definite, accurate, and simple.

"Attachments for Vital Teeth in Fixed Bridge Work."
By Forrest H. Orton..St. Paul, Minn.
(Dr. Orton's reputation as a technician and teacher of teachable technic is so great that no dentist can afford to miss an opportunity to hear him lecture.)

"Mandibular Movements and the Forms of Artificial Bicuspids and Molars Necessitated Thereby."
By Prof. Alfred Gysi.....
.....Zurich, Switzerland

"Mandibular Control."
By J. Leon Williams, New York City

PROGRAM OF THE SECTION ON ORAL SURGERY, EXODONTIA AND ANESTHESIA

New Orleans, La., October 20-24, 1919

FIRST SESSION

Symposium: "Apicoectomy."

"Its Indications and Contraindications and Root-Canal Technic."
(Illustrated with stereopticon slides.)
By Thomas B. Hartzell.....
..... Minneapolis, Minn.

"Surgical Technic of Apicoectomy."
(Illustrated with stereopticon slides.)
By Chalmers J. Lyons.....
.....Ann Arbor, Mich.
Discussed by
Thomas P. Hinman.....Atlanta, Ga.
William L. Shearer....Omaha, Nebr.
Carl D. Lucas.....Indianapolis, Ind.
Clarence J. Grieves....Baltimore, Md.
H. A. Maves.....Minneapolis, Minn.

"Nitrous Oxid-Oxygen Anesthesia in Oral Surgery and Dentistry."
By J. A. Heidbrink.....
..... Minneapolis, Minn.
Discussed by
Wm. H. Deford....Des Moines, Iowa
John W. Seybold.....Denver, Colo.
Boyd S. Gardner....Rochester, Minn.

"Tic doloureaux—Etiology—Diagnosis—Treatment—Palliative—Blocking and Surgical."
By Rudolph Matas (M. D.).....
.....New Orleans, La.
Discussed by
Herbert A. Potts.....Chicago, Ill.

SECOND SESSION

"Impacted Lower Third Molar."
(Illustrated.)
By George B. Winter..St. Louis, Mo.
Discussed by
J. P. Henahan.....Cleveland, O.
Harry W. Allen....Kansas City, Mo.
O. T. Dean.....Seattle, Wash.
Roy S. Hopkinson.. Milwaukee, Wis.

Symposium: "Block Anesthesia."

"Preparation of Solution."
By E. A. Litchfield..Humboldt, Nebr.

"Pharmacology of Various Local Anesthetics."
By Samuel L. Silverman.....
..... Atlanta, Ga.

"Indications and Contraindications."
By Fred F. Molt.....Chicago, Ill.

"Technic of Blocking."
(Most Important Injections.)
By .....

"Suggestive Therapy and Treatment of Abnormal Conditions During and Following Injections."
By P. G. Puterbaugh....Chicago, Ill.

"Diseases of the Antrum."
(Illustrated with stereopticon slides.)
By Charles H. Oakman, Detroit, Mich.
Discussed by
R. Boyd Bogle.....Nashville, Tenn.
Truman W. Brophy.....Chicago, Ill.

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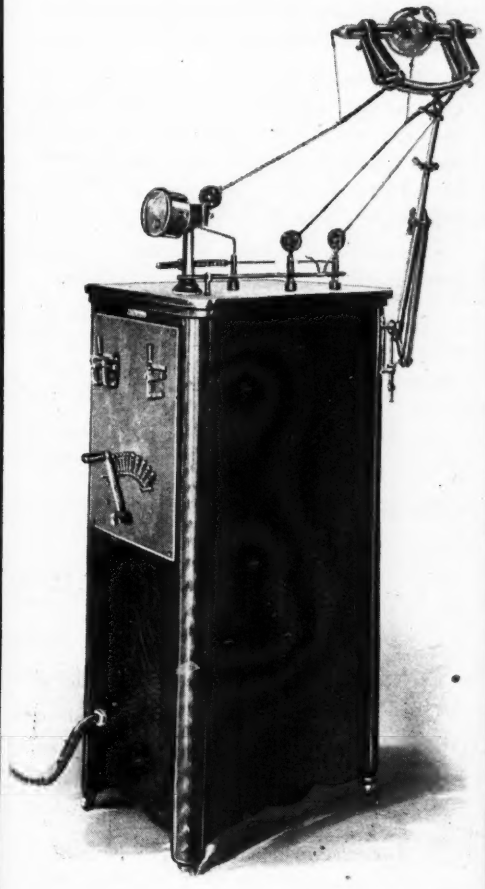

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